Denver Journal of International Law & Policy

Volume 41
Number 4 *Summer - 45th Annual Sutton Colloquium*

Article 2

April 2020

Keynote: Sustaining Society in the Anthropocene Epoch

Nicholas A. Robinson

KEYNOTE: SUSTAINING SOCIETY IN THE ANTHROPOCENE EPOCH

NICHOLAS A. ROBINSON*

I. INTRODUCTION

Public International Law, along with the nation states that shape it, evolved during a period of relative environmental and geological stability on Earth. Nation states facilitated the emergence of the global market economy during the waning of the Middle Ages. Mercantilism and colonial governance shaped the borders of nations on all continents.[1] Socio-economic development accelerated with the Industrial Revolution, and humans made inventive and unprecedented use of the Earth's resources, finally breaking free of the gravity of the planet and entered into orbital space, and exploring remotely and virtually deep light years into the universe. From the explorations of Charles Darwin and other scientists, we came to know the natural science of life on Earth. The field of ecology was born at the start of the 1900s; the tools of remote sensing reaching all parts of the Earth and its atmosphere were fashioned only in the past 40 years.[2]

This paper explores the argument that human transformation of Earth's systems is eclipsing the international law-making of nation states. Globally the processes of trade law or environmental law often progress transnationally, with little direction by national governments.[3] Intergovernmental and non-governmental international organizations act with autonomy, apart from nations.[4] To be clear, nation states still are the major players in world order, but trends of

---

* Nicholas A. Robinson is the Gilbert and Sarah Kerlin Distinguished Professor of Environmental Law Emeritus and Co-Director and founder of the Center for Environmental Legal Studies at Pace University School of Law. He has served as legal advisor and chairman of the Commission on Environmental Law of the International Union for the Conservation of Nature and Natural Resources, engaged in drafting treaties and counseling different countries on the preparation of their environmental laws. He has practiced environmental law in law firms for municipalities and as general counsel of the New York State Department of Environmental Conservation. In 1969, he was named to the Legal Advisory Committee of the President's Council on Environmental Quality. He also edited the proceedings of the 1992 United Nations Earth Summit in Rio de Janeiro, Brazil.

1. *See, e.g.*, MICHELINE R. ISHAY, THE HISTORY OF HUMAN RIGHTS: FROM ANCIENT TIMES TO THE GLOBALIZATION ERA 65, 72, 101 (1st ed. 2004).

2. *See Remote Sensing: NASA Remote Sensing Accomplishments*, NASA EARTH OBSERVATORY, http://earthobservatory.nasa.gov/Features/RemoteSensing/remote_09.php (last visited Aug. 9, 2013).

3. Guido Bertucci & Adriana Alberti, *Globalization and the Role of the State: Challenges and Perspectives*, *in* REINVENTING GOVERNMENT FOR THE TWENTY-FIRST CENTURY: STATE CAPACITY IN A GLOBALIZING SOCIETY 20 (Dennis A. Rondinelli & G. Shabbir Cheema eds., 2003).

4. *See id.* at 19.

sustainable development or social networked communications transcend individual nations.[5] Whether viewed as environmental law or sustainability law, this body of law exists at once globally and locally; it is different in kind from the Westphalia legacy of law existing separately at international and national levels.[6] This paper explores how the concepts of environmental sustainability permeate how human society is responding to the many changes humans have made affecting the Earth. Since 1992, concepts of sustainability or sustainable development have been tested as ways to adapt to the new conditions.[7] However, successfully adapting to today's global environmental conditions entails reassessing the assumptions with which society has governed itself since 1945.[8] What principles should guide socio-ecological relations in coming years?

A. A Brief History of Human Adaptation

Development entails change. For 4,000 years, human invention in the Agricultural Revolution allowed humans to settle all parts of the Earth. Incrementally, they transformed the lands of the planet. George Perkins Marsh was among the first to describe this phenomenon in 1864, in his study *Man and Nature*.[9] The magnitude of human changes to the planet only became fully evident in the past 40 years; with satellite images, society came to understand the scale and permanence of human transformations of the planet, especially in the past 200 years of the Industrial Revolution.[10] In Marsh's day, after the agricultural economy—including commercial hunting—reached across the world, scientists and early explorers noted the loss of species and their habitat.[11] Public sentiment favored the beauty and wonder of nature.[12] With the end of the 19th century, a global move for nature conservation emerged.[13] In international law, this took the form of treaties that, for example, sought to conserve populations of sea seals hunted for their fur, and to set up transboundary parks and protected areas, or

---

5. *See id.* at 18, 21.

6. John R. Worth, Note, *Globalization and the Myth of Absolute National Sovereignty: Reconsidering the "Un-Signing" of the Rome Statute and the Legacy of Senator Bricker*, 79 IND. L.J. 245, 259-60 (2004).

7. GILBERTO GALLOPÍN, A SYSTEMS APPROACH TO SUSTAINABILITY AND SUSTAINABLE DEVELOPMENT 7 (2003).

8. Miles Kahler, Global Governance Redefined, Presentation at Washington University School of Law's Conference on Globalization, the State, and Society 1, 5 (Nov. 13-14, 2003), *available at* http://law.wustl.edu/centeris/Papers/globalization/KAHLERMilesFINALPAPER.pdf.

9. *See* GEORGE P. MARSH, MAN AND NATURE; OR, PHYSICAL GEOGRAPHY AS MODIFIED BY HUMAN ACTION 517-49 (1864).

10. Matt Stiles, *Stunning Satellite Imagines Show a Changing Globe*, THE TWO WAY: BREAKING NEWS FROM NPR (May 9, 2013, 2:01 PM), http://www.npr.org/blogs/thetwo-way/2013/05/09/182593822/stunning-satellite-images-show-a-changing-globe.

11. David Lowenthal, *Introduction* to GEORGE PERKINS MARSH, MAN AND NATURE, at ix, xvii (David Lowenthal ed., Harvard Univ. Press 1965) (1864).

12. *See id.* at xxi-xxii.

13. *Id.*

establish management regimes along international rivers.[14] Such international laws were mirrors of comparable national and local legislation, establishing seasons for hunting and fishing, game refuges for local and regional protected areas and parks, and regulations to curb excessive timbering.[15] As conservation became scientific, the concepts of "sustained yield" or tree farming were introduced to allow for reproduction of species sufficient to sustain annual harvests.[16] It had become evident that unbridled human exploitation of natural resources could exceed the sustained yield of the resources, and when governments came to recognize this, they enacted legal regimes for nature conservation.[17]

Relevant to the discussion of sustainability as the focus of this Sutton Colloquium of the University of Denver Sturm College of Law, is the history of the creation of the nearby Rocky Mountain National Park.[18] The natural beauty of the Continental Divide and the Front Range and Mummy Range of the Rockies, is extraordinary. Rising in altitude, the region embraces three biological zones: the montane zone, with meadows, Ponderosa Pine, and aspen; the subalpine zone, with Englemann spruce, alpine fir, and limber pine; and the alpine zone above 10,500 feet, with tundra and life beyond the tree zone. Here amidst lakes and streams may be found the headwaters for rivers flowing east, the St. Vrain, Big Thompson, Fall, and Cache La Poudre, while the flows from the west head for the Colorado River. Archaeological records show us that humans apparently came to live here during the Altithermal period, from 5,500 to 3,000 B.C., when the plains endured a period of very hot and dry weather.[19] Humans returned to the plains when the climate mellowed.[20] The technological improvement of the bow and arrow brought improvements in hunting wild animals between 650 and 1,000 A.D.[21] Subsequent years experienced competition among tribes of indigenous people for the resources of the plains and mountains.[22] When American settlers from the east came to the

14. *See, e.g.*, Treaty Between the Government Of the Republic Of Mozambique, the Government Of the Republic Of South Africa and the Government Of the Republic Of Zimbabwe On the Establishment Of the Great Limpopo Transfrontier Park, Dec. 9th, 2002, *available at* http://www.tbpa.net/docs/pdfs/SecMan/SecManIntTreatyFinalNov2002.pdf; Convention Between the United States, Great Britain, Russia and Japan for the Preservation and Protection of Fur Seals pmbl., July 7, 1911, 37 Stat. 1542, *available at* http://docs.lib.noaa.gov/noaa_documents/NOS/ORR/TM_NOS_ORR/TM_NOS-ORR_17/HTML/Pribilof_html/Documents/THE_FUR_SEAL_TREATY_OF_1911.pdf; Convention Providing for the Equitable Distribution of the Waters of the Rio Grande for Irrigation Purposes, U.S.-Mex., May 21, 1906, 34 Stat. 2953.

15. *See, e.g.*, LAWRENCE M. FRIEDMAN, A HISTORY OF AMERICAN LAW 314 (3d ed. 2005).

16. Robert L. Fischman & Jeffrey B. Hyman, *The Legal Challenge of Protecting Animal Migrations as Phenomena of Abundance*, 28 VA. ENVTL. L.J. 173, 178 (2010).

17. *Id.*

18. Chester L. Brooks, *Foreword* to C.W. BUCHHOLTZ, ROCKY MOUNTAIN NATIONAL PARK: A HISTORY, at xi, xi (1983).

19. C.W. BUCHHOLTZ, ROCKY MOUNTAIN NATIONAL PARK: A HISTORY 12 (1983).

20. *Id.*

21. *Id.* at 14-15.

22. *Id.* at 16.

Rockies in the 1870s, they brought extraordinary new technological tools.[23] They also found the trails to traverse the mountains, as they ventured even further west.[24]

Human development ensued: trapping, gold rush fever and mining, hunting elk and deer, ranching with cattle, building irrigation canals and ditches to move the waters around, cutting timber as needed, and a small but growing stream of tourists, with hotels and lodges appearing to meet the need.[25] All took their toll of the ecology of the Rockies, especially around Estes Park.[26] Into this scenario came Enos A. Mills.[27] He had first visited the area in the 1880s, ascending Long's Peak and becoming bonded with his Rockies.[28] Following in John Muir's tradition, he published 16 books and many essays to celebrate and defend his mountains.[29] Mills erected signs, "wild flower notices," to tell visitors to protect flora.[30] His essays and books exposed the harm humans were capable of causing; people were often unaware of the environmental consequences of their behavior.[31] His words still ring true today, and are not unlike the complaints and contemporary warnings made by environmentalists in developing nations.[32] They are also still appropriate for us in the U.S.A. In light of recent wildfires in the west, consider Enos Mills words from 1911:

> Most Rocky Mountain fires not only skin off the humus but so cut up the fleshy soil and so completely destroy the fibrous bindings that the elements quickly drag much of it from the bones and fling it down into the stream-channels. Down many summit slopes in these mountains, where the fires went to bed-rock, the snows and waters still scoot and scour. The fire damage to some of these steep slopes cannot be repaired for generations and even centuries.[33]

Mills knew that unless the regions around Estes Park were not to be set-aside as a legally protected area, it would be nibbled to death.[34] The story of the Rocky Mountain National Park is for another time. After a spirited public debate between many utilitarian proponents favoring developing the commodities of the region, and many conservationists led by Mills favoring "recreation, natural beauty, and patriotism," the conservation argument won and in 1915, Congress enacted the law

---

23. *See id.* at 27.

24. *See id.*

25. ALEXANDER DRUMMOND, ENOS MILLS: CITIZEN OF NATURE 30-31 (1995).

26. *Id.* at 153.

27. *Id.* at 29-30.

28. *Id.* at 37-40.

29. Byron Anderson, *Enos Abijah Mills: The "Father" of the Rocky Mountain National Park (1870-1922)*, FOREST HIST. TODAY, Spring-Fall 2007, at 56, 57.

30. DRUMMOND, *supra* note 25, at 129-130.

31. Anderson, *supra* note 29, at 58.

32. BLACKSMITH INST., THE WORLD'S WORST POLLUTION PROBLEMS: ASSESSING HEALTH RISKS AT HAZARDOUS WASTE SITES 6 (2012), *available at* http://www.worstpolluted.org/files/FileUpload/files/2012%20WorstPolluted.pdf.

33. ENOS ABIJAH MILLS, THE SPELL OF THE ROCKIES 148 (1911).

34. DRUMMOND, *supra* note 25, at 228.

to establish the Park.[35]

Enos Mills published his book *Your National Parks* in 1917.[36] While he later became a critic of the National Parks Service, in this work he celebrated the then 17 national parks, including the one he helped to create.[37] He contended that "[a] National Park is an island of safety in this riotous world. . . . [It is] a fountain of life. . . . It holds within its magic realm benefits that are health-giving, educational, economic; that further efficiency and ethical relations, and are inspirational."[38] He believed that "National Parks provide climate for everybody and scenery for all."[39] Mills argued that parks build national character and unite people around shared values.[40] He noted that:

> Lack of national unity is perilous. . . . The people of the United States are united in name, but are they doing good team-work? The mingling of people from all quarters in their own great National Parks means friendly union. The Westerner ought to know the Easterner. . . .
>
> . . . There is nothing like acquaintance for promoting friendship, sympathy, and cooperation. . . .
>
> He who feels the spell of the wild, the rhythmic melody of falling water, the echoes among the crags, the bird-songs, the wind in the pines, and the endless beat of wave upon the shore, is in tune with the universe.[41]

The story of Mills and the campaign to save Rocky Mountain National Park offers important insights into the question of how human society should conceive of sustainability. Only by establishing legal regimes for large ecological landscapes can we leave space for natural systems to evolve during the coming eons. If humans colonize every corner of the Earth, they squeeze out room for nature. Law establishes our rules for how humans relate to nature.

This is not just an American experience. Following the leadership of the U.S.A., nearly every nation on Earth today has established national parks and an agency responsible for them.[42] This is done voluntarily. The national park services are all members of the World Commission on Protected Areas of the International Union for the Conservation of Nature and Natural Resources ("IUCN", founded in 1948).[43] They cooperate together effectively. As a human

---

35. *Id.* at 245.

36. ENOS A. MILLS, YOUR NATIONAL PARKS (1917).

37. *E.g.*, *id.* at 175 ("Magnificent mountains in the sky, peak after peak along the horizon—an inspiring skyline—such is the setting of the Rocky Mountain National Park.").

38. *Id.* at 379.

39. *Id.* at 380.

40. *See id.* at 381-82.

41. *Id.* at 385-86.

42. *See Members' Database*, INT'L UNION FOR CONSERVATION OF NATURE, http://www.iucn.org/about/union/members/who_members/members_database (last visited May 11, 2013) (listing country specific conservation organizations).

43. *See About IUCN*, INT'L UNION FOR CONSERVATION OF NATURE, http://www.iucn.org/about

species, through our nation states, we have set aside lands and waters greater in size than the entire Indian sub-continent.[44] States and local governments continue this work, often being led locally by individuals such as Enos Mills.[45] The global networks of parks and protected areas sustain natural systems world-wide.[46]

This sort of cooperation is often so familiar we take it for granted. Nonetheless, each time a campaign is launched to establish or expand a protected area, the same big public debate ensues. "Do we want to lock up land or develop it?" Public participation in environmental decision-making is essential; it provides continuing public education, transparent comparisons of competing stakeholder interests, and a reaffirmation of democratic decision-making. In America, our laws facilitate such decision-making, through the federal Administrative Procedure Act, Freedom of Information Act, and National Environmental Policy Act, and comparable laws in our states. We should take pride that these American laws have also been emulated internationally. They were adopted in 1992 as key parts of the UN Declaration of Rio De Janeiro on Environment and Development, in Principles 10 and 17.[47] They have also been incorporated into the Aarhus Convention on Public Participation and Access to Information in Environmental Decision-making and Access to Justice.[48] Most recently, several nations have taken the lead in evolving these legal tools, for example the Supreme Court of the Philippines has enacted new judicial procedures for hearing environmental cases and established a new extraordinary writ, the Writ of Kalikasan (Nature).[49]

Why is this cooperation and exchange of best practices for environmental decision-making important? What relationship does all this have to sustainable development or wider questions of sustainability? These questions will be explored in the next section.

B. Questioning the Sufficiency of Sustained Yield

Despite the establishment of protected areas, the rate of the extinction of

(last visited Aug. 13, 2013).

44. *See World Heritage Facts and Figures 2012*, INT'L UNION FOR CONSERVATION OF NATURE, http://www.iucn.org/about/work/programmes/wcpa_worldheritage/resources/wcpa_whfacts (last visited May 11, 2013).

45. *See, e.g., About ACF*, AFR. CONSERVATION FOUND., http://www.africanconservation.org/about (last visited May 13, 2013).

46. *See IUCN World Commission on Protected Areas*, INT'L UNION FOR CONSERVATION OF NATURE, http://www.iucn.org/about/work/programmes/gpap_home/gpap_wcpa (last visited May 11, 2013).

47. United Nations Conference on Environment and Development, Rio de Janiero, Braz., June 3-14, 1992, *Rio Declaration on Environment and Development*, U.N. Doc. A/CONF.151/26 (Vol. I), Annex I (Aug. 12, 1992) [hereinafter *Rio Declaration*].

48. Convention on Access to Information, Public Participation in Decision-Making and Access to Environmental Justice in Environmental Matters pmbl., June 25, 1998, 2161 U.N.T.S. 447 [hereinafter Aarhus Convention].

49. Rules of Procedure for Environmental Cases, A.M. No. 09-6-8-SC (S.C., Apr. 13, 2010) (Phil.), *available at* http://www.lawphil.net/courts/supreme/am/am_09-6-8-sc_2010.html.

species is enormous.[50] Its scale and proportions are that of the loss of life forms during the extinction of the dinosaurs, only this time we humans are the cause.[51] When we set up game refuges, or regional marine fishing quotas, we seek to ensure "sustained yield" of the animal we harvest. Many species, however, migrate across borders and no single nation can ensure adequate protection across their range. On the seas, despite improvements regarding straddling and migratory stocks of fish, a lack of scientific data and inadequate cooperation among flag states have allowed practices akin to the "clear-cutting" of ocean fish world-wide.

When we humans undercut flora and fauna, we also diminish the capacity of Earth's life support systems to support human life.[52] We have, as the ecologist Aldo Leopold argued, a community of life, which cannot be disaggregated.[53] Our diplomats and foreign policy leaders have made the same observations.[54]

In 1987, the World Commission on Environment and Development, chaired by the then Prime Minister of Norway, Gro Harlem Bruntlund, wrote in its report entitled *Our Common Future*, that: "The Earth is one but the world is not."[55] The Earth's natural systems sustain life. Humans are part of life, having evolved within and living amidst nature. Yet the world is governed by the collective or individualistic policies of different nation states and other human enterprises. To compensate for the environmental impact of unsustainable practices, nations have negotiated a body of fine international environmental law,[56] but the problems are getting ahead of the agreed solutions. The UN Convention to Combat Desertification has not ended the march of deserts or soil degradation.[57] The Geneva Convention on Long-Range Transboundary Air Pollution has moderately abated acid rain in northern Europe, but acid rain in all other parts of the world is at all time highs.[58] "Atmospheric Brown Cloud" inundates South Asia with much

50. Genese Marie Sodikoff, *Introduction Accumulating Absence: Cultural Production of the Sixth Extinction*, *in* THE ANTHROPOLOGY OF EXTINCTION: ESSAYS ON CULTURE AND SPECIES DEATH 1, 1 (Genese Marie Sodikoff ed., 2012).

51. *See id.* at 1-2.

52. J.C. Wilkinson, *The Importance of Flora and Fauna to Human Existence on Earth*, BRIGHT HUB, http://www.brighthub.com/environment/science-environmental/articles/61556.aspx (last updated May 31, 2011).

53. ALDO LEOPOLD, A SAND COUNTY ALMANAC WITH OTHER ESSAYS ON CONSERVATION FROM *ROUND RIVER* 219-20 (1966).

54. *See* WORLD COMM'N ON ENV'T AND DEV., OUR COMMON FUTURE 28 (1987), *available at* http://www.un-documents.net/our-common-future.pdf.

55. *Id.*

56. *See* UNITED NATIONS ENV'T PROGRAMME, TRAINING MANUAL ON INTERNATIONAL ENVIRONMENTAL LAW 58-63 (Lal Kurukulasuriya & Nicholas A. Robinson eds., 2006) [hereinafter TRAINING MANUAL].

57. *World Day to Combat Desertification*, UNITED NATIONS, http://www.un.org/en/events/desertificationday/background.shtml (last visited Apr. 10, 2013).

58. *See* TRAINING MANUAL, *supra* note 56, at 95; *Acid Rain: Progress Report on Acid Rain*, UPPER MIDWEST AEROSPACE CONSORTIUM, http://www.umac.org/ocp/ProgressReportonAcidRain/info.html (last visited Apr. 15, 2013).

of Asia's air pollution.[59] The Bonn Convention on Migratory Species protects selected migration ranges in Europe and Africa, but few elsewhere and not a single nation in the Western Hemisphere cares enough to join and safeguard our song birds, butterflies, or other shared species up and down the American flyways.[60] Despite the injunction in the Convention on the Law of the Sea for all states to "protect" the marine environment, oceans are more polluted and changed than ever.[61]

Although, since the 1970s, environmental law seeks to restore reciprocity between natural systems and human polity, however, the remedies of environmental law are coming too late to avert irreversible change to Earth.[62] Scholars are not the only people to see this happening. When the United Nations convened the world's largest summit meeting ever held, the 1992 UN Conference on Environment and Development ("UNCED"), all diplomats agreed to open their historic soft-law statement entitled *Agenda 21*, with these telling words: "*Humanity stands at a defining moment in history.*"[63]

While it is necessary and important to set aside national parks and preserve the habitat for species in danger of becoming extinct, it is not sufficient to do so. Equivalent measures are needed in all environmental sectors. Over the past two centuries, scientists in IUCN, in universities, and in national academies of science world-wide, have documented changes to the planet that affect human wellbeing, and indeed all life.[64] The late ecologist Dr. Eugene Stroemer and Nobel laureate Dr. Paul Crutzen have proposed we humans have entered a new epoch, which they call the "*Anthropocene.*"[65] Hallmarks of this epoch are the changes to the Earth's

---

59. *Wide Spread and Complex Climatic Changes Outlined in New UNEP Project Atmospheric Brown Cloud Report*, UNITED NATIONS ENV'T PROGRAMME (Nov. 13, 2008), http://www.unep.org/documents.multilingual/default.asp?documentid=550&articleid=5978&l=en.

60. *See Appendices I and II of the Convention on the Conservation of Migratory Species of Wild Animals*, CONVENTION ON MIGRATORY SPECIES, http://www.cms.int/documents/appendix/appendices_e.pdf (last updated Feb. 23, 2012) (list of migratory species in convention); *Parties to the Convention on the Conservation of Migratory Species of Wild Animals and its Agreements*, CONVENTION ON MIGRATORY SPECIES, http://www.cms.int/about/partylist_e.pdf (last updated Apr. 1, 2013) (list of parties to the convention and their agreements).

61. United Nations Convention on the Law of the Sea art. 145, Dec. 10, 1982, 1833 U.N.T.S. 3; *Conserving Wild Fisheries*, NAT. RESOURCES DEF. COUNCIL, http://www.nrdc.org/oceans (last visited Aug. 14, 2013).

62. *See* Richard Black, *Green Decline 'May Bring Irreversible Change,'* BBC (June 6, 2012, 1:44 PM), http://www.bbc.co.uk/news/science-environment-18339905.

63. UNITED NATIONS SUSTAINABLE DEV., AGENDA 21 ¶ 1.1 (1992) (emphasis added), *available at* http://sustainabledevelopment.un.org/content/documents/Agenda21.pdf [hereinafter AGENDA 21] (emphasis added).

64. *See, e.g.*, CLIVE PONTING, A NEW GREEN HISTORY OF THE WORLD: THE ENVIRONMENT AND THE COLLAPSE OF GREAT CIVILIZATIONS 380-408 (Rev. ed. 2007); JAMES GUSTAVE SPETH, RED SKY AT MORNING: AMERICA AND THE CRISIS OF THE GLOBAL ENVIRONMENT 52-56 (2004).

65. LUIS VEIGA DA CUNHA, WATER IN THE ANTHROPOCENE: A REFLEXION ON SUSTAINABILITY 3 (2012), *available at* http://www.ppa.pt/wp-content/uploads/2012/06/ppa_brochura_eng.pdf.

hydrologic cycle and other environmental systems.[66]

Acknowledging the changed conditions on the Earth invites exploration of what changes should be made in human laws and practice. Is sustainability enough? This paper examines what foundations in law may be essential in this new epoch, beginning with the concept of "sustainable" development.

II. "SUSTAINABLE" DEVELOPMENT

Since 1992, when the Rio UN Conference on Environment and Development adopted *Agenda 21*,[67] national legislatures, environmental ministries, and courts have implemented and applied roughly congruent programs for environmental sustainability worldwide.[68] The Principles of the UN Rio Declaration on Environment and Development have been incorporated into national constitutions and laws.[69] At national levels, patterns building toward environmental sustainability have emerged.[70] This "Earth Summit" was to usher in an era of "sustainable development."[71] *Agenda 21* and the Rio Declaration on Environment and Development were to guide this new path, a pervasive expansion of sustainability beyond its original context of sustained yield for biological systems.[72] Troubled that not enough action was taking place nationally, in 2002, in Johannesburg, the UN Member States adopted the "Plan of Implementation" for *Agenda 21* at the UN World Summit on Sustainable Development.[73] After two decades of deliberations on the issues of *Agenda 21* in the UN Commission on Sustainable Development, in June of 2012, 40,000 people assembled again in Rio de Janeiro for "Rio+20" to jump-start the progress on implementing sustainable development recommendations.[74]

At the plane of international law, and at the national law level, it must be conceded that the promise of "sustainable development" remains elusive, despite

---

66. For example, the huge floods last year in Indochina, which covered an area the size of Spain and inundated most of Bangkok, or the devastating floods the year before that wiped out the human settlements of the historic Indus River Valley in Pakistan, or the humbling and tragic days of the mega-storm Hurricane Sandy in New York City and the Atlantic coast, from where I travelled in order to attend this Sutton Colloquium.

67. AGENDA 21: EARTH'S ACTION PLAN, at ii (Nicholas A. Robinson ed., 1993).

68. *Id.* at xv-xvi, xviii, xxi.

69. U.N. Secretary-General, *Rio Declaration on Environment and Development: Application and Implementation: Rep. of the Secretary-General*, ¶ 89-90, U.N. Doc. E/CN.17/1997/8 (Feb. 10, 1997) [herein after *Application and Implementation*].

70. Nicholas A. Robinson, *Introduction* to 1 COMPARATIVE ENVIRONMENTAL LAW & REGULATION, at v, vii (Nicholas A. Robinson, Lye Lin Heng & Elizabeth Burleson eds., 2012).

71. *Application and Implementation*, *supra* note 69, ¶ 2.

72. *See id.* ¶¶ 1-2.

73. World Summit on Sustainable Development, Johannesburg, S. Afr., Aug. 26-Sept. 4, 2002, *Plan of Implementation of the World Summit on Sustainable Development*, 6-72, U.N. Doc. A/CONF.199/20, Annex.

74. *UN Senior Officials Highlight Rio+20 Achievements*, UN NEWS CENTRE (June 28, 2012), http://www.un.org/apps/news/story.asp?NewsID=42352#.UWzSChnudu4.

many best efforts to embrace the many sensible prescriptions around the concept.[75] Meeting last June at the UN Rio+20 Conference in Brazil, most foreign ministries were blind to their nation's own domestic environmental legal norms and standards; diplomats need to become ecologically literate, if only to ensure that their nation does not harm the environment of another nation or the Earth's shared global systems.[76] Few foreign ministries employ environmental law specialists, so their deliberations leading up to Rio+20 could neither reflect nor build upon their own national environmental laws.[77] The outcome of Rio+20 is less progressive than the provisions in the Constitutions of most UN Member States.[78] Moreover, providing ecological security is becoming a more immediate need than providing for military security, but governments at Rio+20 last June, 2012, did not treat environmental sustainability on a par with national military defense.[79]

The Rio+20 outcome document, entitled "The Future We Want," reaffirmed the accumulated policies on sustainable development of the past two decades, and went on to acknowledge that more effective intergovernmental cooperation was urgently needed.[80] The diplomatic rhetoric expressed urgency in their institutional and governance recommendations, but their words broke no new ground as a matter of policy or law.[81] The governments noted, once again, the Earth's deteriorating environment. For example, with reference to the over-arching challenges of climate change, governments stated:

> We reaffirm that climate change is one of the greatest challenges of our time, and we express profound alarm that emissions of greenhouse gases continue to rise globally. We are deeply concerned that all countries, particularly developing countries, are vulnerable to the adverse impacts of climate change, and are already experiencing increased impacts, including persistent drought and extreme weather events, sea-level rise, coastal erosion and ocean acidification, further threatening food security and efforts to eradicate poverty and achieve sustainable development. In

75. *See, e.g.*, JOHN C. DERNBACH, ACTING AS IF TOMORROW MATTERS: ACCELERATING THE TRANSITION TO SUSTAINABILITY 69, 187-200 (2012).

76. Nicholas A. Robinson, *Reflecting on Measured Deliberations*, 42 ENVTL. POL'Y & L. 219, 220 (2012) [hereinafter Robinson, *Measured Deliberations*].

77. *Id.* at 220-21.

78. *See, e.g.*, Editorial, *Rio+20: Manana, Manana*, GUARDIAN (June 19, 2012), http://www.guardian.co.uk/commentisfree/2012/jun/19/rio-summit-manana-manana-editorial.

79. Robinson, *Measured Deliberations*, *supra* note 76, at 221.

80. Rio+20: United Nations Conference on Sustainable Development, Rio de Janeiro, Braz., June 20-22, 2012, *The Future We Want*, ¶¶ 11, 14-18, U.N. Doc. A/CONF.216/L.1 (June 19, 2012) [hereinafter *Future We Want*]. This document was eventually adopted as a resolution by the U.N. General Assembly. G.A. Res. 66/288, U.N. Doc. A/RES/66/288 (July 27, 2012).

81. *Id.* ¶¶ 12-13, 25; *see* Brendan Montague, *Analysis: Rio+20—Epic Failure*, THE BUREAU OF INVESTIGATIVE JOURNALISM (June 22, 2012), http://www.thebureauinvestigates.com/2012/06/22/analysis-rio-20-epic-fail; John Vidal, *Rio+20: Earth Summit Dawns with Stormier Clouds than in 1992*, GUARDIAN (June 19, 2012, 8:00 PM), http://www.guardian.co.uk/environment/2012/jun/19/rio-20-earth-summit-1992-2012.

> this regard we emphasize that adaptation to climate change represents an immediate and urgent global priority.[82]

Notwithstanding the reluctance to make new substantive policy at the Rio+20 event, the UN Member States did resolve that the time has come for the United Nations to revisit what institutional reforms would be necessary to sustain Earth's environmental quality, in particular the possible reform of the Commission on Sustainable Development (established in 1992) and the United Nations Environment Programme ("UNEP") (established in 1972).[83] When the UN General Assembly began its deliberations in September of 2012, it was to have convened a committee of UN Member States to consider the recommendations of Rio+20.[84] Governments are manifestly challenged, collectively and individually, about how to reassess what more each must do to safeguard its own environment, and equally to explore how to leverage these national actions into much greater global effectiveness.[85]

While nation states are unable to respond, others did act at Rio+20. There were some 2,500 "side events," or meetings on topics of planetary environmental issues and sustainable development.[86] Five hundred of these meetings were convened by governments and intergovernmental organizations, and the balance by non-governmental organizations (NGOs).[87] Cities and local authorities have an expanding network of local programs and laws to cope with the impacts of climate change and build resilient sustainability.[88] The NGOs include the business community, such as the World Business Council for Sustainable Development

---

82. *Future We Want*, *supra* note 80, ¶ 190. Paragraph 191 states:

> We underscore that the global nature of climate change calls for the widest possible cooperation by all countries and their participation in an effective and appropriate international response, with a view to accelerating the reduction of global greenhouse gas emissions. We recall that the United Nations Framework Convention on Climate Change provides that parties should protect the climate system for the benefit of present and future generations of humankind on the basis of equity and in accordance with their common but differentiated responsibilities and respective capabilities.

Id. ¶ 191.

83. *Id.* ¶¶ 84, 88; *Rio+20 Conference: About Rio+20*, EPA, www.epa.gov/international/io/rio20.html (last visited Apr. 15, 2013) [hereinafter *About Rio+20*].

84. *Future We Want*, *supra* note 80, ¶¶ 256-57. In its Agenda for the 67th Session of the General Assembly, the UN planned to discuss the implementation of AGENDA 21 and the outcomes of the World Summit on Sustainable Development and of the United Nations Conference on Sustainable Development, which is assumed to include paragraphs 256-57. U.N. GAOR, 67th Sess., 2d plen. mtg. at 2, U.N. Doc. A/67/251 (Sept. 21, 2012). The Open Working Group on Sustainable Development Goals was established on January 22, 2013, by the General Assembly. G.A. Dec. 67/555, U.N. Doc. A/67/L.48/Rev. 1 (Jan. 15, 2013).

85. *Future We Want*, *supra* note 80, ¶¶ 67, 127.

86. Robinson, *Measured Deliberations*, *supra* note 76, at 221.

87. *Id.*

88. *Future We Want*, *supra* note 80, ¶ 22. One of these networks is C40 Cities Climate Leadership Group, a network of the world's megacities committed to addressing climate change. *Global Leadership on Climate Change*, C40 CITIES, http://www.c40cities.org (last visited Aug. 15, 2013).

("WBCSD").[89] Last June at Rio+20 the WBCSD sponsored a supplement to the *International Herald Tribune*, in which WBCSD President Peter Bakker observed that the "hard-won" progress, since the 1992 UN Earth Summit, "has been overwhelmed by the sheer amount of fossil fuels, materials, water and waste flowing through the world economy . . . . We cannot afford this slow pace, which struggles to keep up with current growth."[90] With the exception of the banks and financial institutions, whose unsustainably greedy and often fraudulent practices had brought on the Great Recession of 2008 that cast a pall over the Rio+20 event, many multinational companies came to Rio to showcase genuine innovations for enhancing sustainability.[91] The business interests at Rio were well ahead of governments in their deeds and words.

Also at Rio+20, the UN Environment Programme and the UN Commission on Sustainable Development each sought to encourage national use of the model of a "[g]reen [e]conomy," to encourage innovative technology that fostered economic development without damaging the environment.[92] The Outcome Document from Rio+20 endorsed efforts to facilitate a transition to a green economy, and many of the side-events at Rio+20 showcased alternative ways to generate electricity and build sustainable employment.[93] Unfortunately, in the preparatory committee negotiations leading up to Rio+20, many developing nations took a dim view of the proffered "green economy."[94] Their tepid acceptance grew out of their awareness that the same technologically advanced states that promoted these innovations had made little to no effort to ensure that the green economies technologies would be transferred to, or used by developing economies.[95] For twenty years the "Green Funds" and other sustainable development finance

89. *Rio+20: United Nations Conference on Sustainable Development*, WBSCD, http://www.wbcsd.org/rio-plus-20.aspx (last visited Apr. 15, 2013).

90. Robinson, *Measured Deliberations*, *supra* note 76, at 222.

91. *See Rio+20 Corporate Sustainability Forum*, UNITED NATIONS GLOBAL COMPACT, http://www.unglobalcompact.org/NewsAndEvents/rio_2012 (last updated Feb. 23, 2012).

92. *Inclusive Green Economy Given Go Ahead by Heads of State at Rio+20*, UNITED NATIONS ENV'T PROGRAMME (June 22, 2012), http://www.unep.org/newscentre/Default.aspx?DocumentID=2688&ArticleID=9195&l=en.

93. *See Future We Want*, *supra* note 80, ¶ 59.

94. UNITED NATIONS DEP'T OF ECON. & SOC. AFFAIRS & UNITED NATIONS DEV. PROGRAMME, SYNTHESIS OF NATIONAL REPORTS FOR RIO+20 2 (2012), *available at* http://sustainabledevelopment.un.org/content/documents/742RIO+20_Synthesis_Report_Final.pdf; *Green Economics and the Rise of the Rest*, INT'L REL. & SEC. NETWORK (Feb. 8, 2012), http://www.isn.ethz.ch/isn/Digital-Library/Articles/Special-Feature/Detail/?lng=en&id=136760&tabid=1451591262&contextid774=136760&contextid775=136761.

95. José Antonio Ocampo, *Summary of Background Papers*, *in* THE TRANSITION TO A GREEN ECONOMY: BENEFITS, CHALLENGES AND RISKS FROM A SUSTAINABLE DEVELOPMENT PERSPECTIVE 3, 7, 9-10 (United Nations Dep't of Econ. & Soc. Affairs et al. eds.), *available at* http://www.unep.org/greeneconomy/Portals/88/documents/research_products/UN-DESA,%20UNCTAD%20Transition%20GE.pdf; Diana Cariboni, *Rio+20: Developing Countries Accept Green Economy*, INTER PRESS SERVICE (June 17, 2012), http://www.ipsnews.net/2012/06/rio20-developing-countries-accept-green-economy.

agreements systems remain largely unimplemented. Developing nations opposed endorsing new technologies that would help rich nations and not meet their needs. Virtually none of the "green technology" advocates addressed what laws and governance would be needed to ensure that their technology could become universally used.[96]

From the vantage point of ecologists and earth systems scientists, Rio+20 was a far cry from the accomplishments and expectations of the 1992 Earth Summit in Rio.[97] In 1992, treaties on Biological Diversity and Climate Change were signed, and progress noted for also concluding the 1994 UN Convention on Desertification.[98] No such actions took place to coincide with Rio+20.[99] Scientists who study Earth's systems were clear in their view that Rio+20 accomplished too little, too late.[100] The venerable scientific journal *Nature* published its weekly edition on June 7, 2012 with the cover theme: "Second Chance for the Planet—Can The Rio Earth Summit Reverse twenty years of failure?"[101] The issue included symposia by scientists outlining how governments had failed to implement and demonstrably advance the goals of the biodiversity and climate conventions.[102] *Nature*'s editors complained that governments had "perfected the art of incremental negotiation and redefined circular motion."[103] What Rio+20 needed were "solutions that are cheap, scalable, and politically viable."[104] The moment passed without any being adopted.

III. ENVIRONMENTAL AND INTERNATIONAL LAW: CONTEMPLATING RADICAL CHANGE

Among the core hallmarks of human civilization is the evolution of the rule of law. While not as universally observed as the Universal Declaration of Human Rights contemplates, the human instinct for order with justice is pervasive and

96. Susan Ee Ong et al., *Examining Rio+20's Outcome*, COUNCIL ON FOREIGN REL. (July 5, 2012), http://www.cfr.org/energyenvironment/examining-rio20s-outcome/p28669.

97. Vidal, *supra* note 81.

98. *About the Convention*, UNITED NATIONS CONVENTION TO COMBAT DESERTIFICATION, http://www.unccd.int/en/about-the-convention/Pages/About-the-Convention.aspx (last visited Apr. 15, 2013); Stephanie Meakin, *The Rio Earth Summit: Summary of the United Nations Conference on Environment and Development*, GOV'T OF CAN. PUBLICATIONS (Nov. 1992), http://publications.gc.ca/collections/Collection-R/LoPBdP/BP/bp317-e.htm#HAPPENED.

99. Montague, *supra* note 81.

100. Alden Meyer, *Rio+20: Too Little, Too Late?*, UNION OF CONCERNED SCIENTIST (June 18, 2012), http://blog.ucsusa.org/rio20-too-little-too-late/; Nick Ishmael Perkins, *Rio+20 Must Address the Process of Change, Not Just its Content*, SCIDEV.NET (May 18, 2012), http://www.scidev.net/en/science-and-innovation-policy/science-at-rio-20/editorials/rio-20-must-address-the-process-of-change-not-just-its-content.html.

101. 486 NATURE (2012) (referencing the question that is asked on the cover of this volume).

102. Jeff Tollefson & Natasha Gilbert, *Rio Report Card*, 486 NATURE 20, 20-23 (June 7, 2012).

103. Editorial, *Back to Earth*, 486 NATURE 5, 5 (2012).

104. *Id.* ("The world has a surfeit of pledges, commitments and treaties. What it needs from the second Earth summit in Rio is firm leadership and a viable plan for success.").

profound.[105] Environmental rights and humans rights can be integrated. The Council of the International Union for the Conservation of Nature and Natural Resources ("IUCN") following the 1992 "Earth Summit" framed this synthesis as follows, "a just world that values and conserves nature."[106] The decade before the Earth Summit, IUCN had led the drafting of the United Nations World Charter for Nature, adopted by the UN General Assembly.[107] The World Charter well articulates fundamental norms to sustain a rule of law for nature, many of which have been incorporated into multilateral environmental agreements and other treaties.[108]

The vision of a just world that values and conserves nature embraces aspirations for both human and other living communities.[109] Realization of socio-economic rights and human rights depends upon ecosystem services and a sustaining natural environment. Yet despite this reality, "business as usual" remains among most member states of the United Nations as they do not yet embrace this reality.[110] To be sure, human environmental management practices have evolved rapidly since the nature conservation movement emerged in the late 19th century and with the emergence of environmental law in the wake of the 1972 UN Stockholm Conference on the Human Environment.[111] The IUCN World Commission on Protected Areas reports that more than 10% of terrestrial ecosystems are protected as parklands.[112] Practically every state has enacted pollution control legislation, most have environmental impact assessment laws, and many have enacted sustainable development regimes for promoting alternative energy systems, recycling, and enhanced access to potable water.[113] Environmental law techniques are proven, being refined through continuous improvement, and evolving toward greater effectiveness.[114] Yet the world's substantial volume of environmental legislation and international agreements has not been sufficient to stem irreversible changes happening to the Earth.

---

105. Universal Declaration of Human Rights, G.A. Res. 217 (III) A, U.N. Doc. A/RES/217(III) (Dec. 10. 1948).

106. *About IUCN*, INT'L UNION FOR CONSERVATION OF NATURE, http://www.iucn.org/about (last updated July 10, 2013); INT'L UNION FOR CONSERVATION OF NATURE, A JUST WORLD THAT VALUES AND CONSERVES NATURE FOR A SUSTAINABLE FUTURE (2012), *available at* http://cmsdata.iucn.org/downloads/iucn_vision_for_rio_20_1.pdf.

107. World Charter for Nature, G.A. Res. 37/7, U.N. Doc. A/RES/37/7 (Oct. 28, 1982).

108. *Id.*

109. *Id.*

110. Nicholas A. Robinson, *Beyond Sustainability: Environmental Management for the Anthropocene Epoch*, 12 J. PUB. AFF. 181, 184-185 (2012) [hereinafter Robinson, *Beyond Sustainability*].

111. *Id.* at 187-88.

112. Lauren Coad et al., *Progress Towards the Convention on Biological Diversity Terrestrial 2010 and Marine 2012 Targets for Protected Area Coverage*, PARKS, Dec. 12, 2008, at 35, 37, *available at* http://cmsdata.iucn.org/downloads/parks_17_2_web.pdf.

113. *See generally* COMPARATIVE ENVIRONMENTAL LAW & REGULATION (Nicholas A. Robinson, Lye Lin Heng & Elizabeth Burleson eds., 2012).

114. *Id.*

Unfortunately, while these laws have proven that they can be effective and applied efficiently, they have not been functioning at the scale necessary to safeguard the environment. "Business as usual" overwhelms their remedial objectives.

A. Development: "Business as Usual"

"Business as usual" relies on the well-established socio-economic order that nations have developed, much of it in the past century.[115] Rural electrification is bringing many of the benefits of technologies once enjoyed only in cities.[116] Technological innovation has made the discovery and extraction of coal, oil, and gas enormously more efficient, to fuel rapid economic expansion in China and India, while sustaining the economies of North America, the Middle East, and elsewhere. Expectations of social progress and economic growth have been fulfilled. "Miracle" rice feeds millions as the human species multiplies its numbers, and the internet facilitates on-line education, ever–expanding the social networking among peoples across the globe. Medical research promises new healthcare attainments. Earth scientists learn more about the planet's natural systems than humans have ever known before.[117]

The maxim, "if it is not broken, do not fix it" envelops "business as usual" models. The liberal economic model of "continuous" growth has been questioned rigorously,[118] but despite the events of the Great Recession of 2008, growth is the economic model of choice for a "business as usual" society world-wide. The default setting is to stay with settled practices; rarely do settled economic systems incorporate the critical reassessments of trends or seek to apply management reforms for "continuous improvement." Worldwide, whether for commercial transactions, intellectual property, real estate development, financing, or natural resource exploitation, today's legal regimes support existing patterns of economic growth.[119] The World Bank, International Monetary Fund, and World Trade Organization each invest in ensuring stability in these national regimes of economic growth. Where corruption undermines sound economic growth, and creates social instability that threatens growth, governments promote the "rule of law," and are open to promoting norms for "sustainable" development. However, even where environmental problems are manifest and acute, as today in many major cities, governments attend to them tepidly, worried that spending money to

115. *See* Robinson, *Beyond Sustainability*, *supra* note 110, at 182.

116. WORLD BANK INDEP. EVALUATION GROUP, THE WELFARE IMPACT OF RURAL ELECTRIFICATION: A REASSESSMENT OF THE COSTS AND BENEFITS, at xiii (2008), *available at* http://web.worldbank.org/WBSITE/EXTERNAL/EXTOED/EXTRURELECT/0,,contentMDK:21603520~menuPK:4489096~pagePK:64829573~piPK:64829550~theSitePK:4489015,00.html.

117. NAT'L RESEARCH COUNCIL, NEW RESEARCH OPPORTUNITIES IN THE EARTH SCIENCES 7 (2012).

118. *See generally* JAMES GUSTAVE SPETH, AMERICA THE POSSIBLE: MANIFESTO FOR A NEW ECONOMY (2012).

119. *See* Robinson, *Beyond Sustainability*, *supra* note 110, at 185-86.

resolve environmental problems may inhibit economic growth.

Many sustainable development norms have emerged out of environmental law, and have been accepted by economic systems around the world.[120] For example, the *Polluter Pays Principle* was advanced first at the "birth" of modern environmental law in the 1970s, by the Organization for Economic Cooperation and Development ("OECD"), and provided justifications for laws to curb environmental pollution.[121] This principle at once protected public health and the environment while making the economy more efficient through identifying externalities and averting uncompensated injuries to others.[122] Similarly, techniques of environmental management systems, the International Organization for Standardization's Environmental Management system,[123] or procedures and policies for corporate social responsibility ("CSR") have sought to institutionalize sustainability concepts as part of economic life.[124] On the other hand, some economic interests still benefit from ignoring externalities and are opposed the strictures of environmental law.[125] Coal mining firms in Appalachia violated the Clean Water Act as they launched mountain top mining,[126] and the natural gas hydraulic fracking companies in the U.S.A. secured an exemption from all federal environmental laws, producing widespread environmental degradations of air and water.[127] Even many manufacturing companies that have sound corporate EMS procedures and espouse CSR join in lobbying undertaken by their trade associations to limit the budgets of environmental agencies, so that they may avoid the costs that inspection and enforcement entails.[128] Many government agencies require environmental norms of the private sector and exempt themselves from observing the same norms.[129] Endorsement of sustainability norms would appear

120. *See* Scott Fulton & Antonio Benjamin, *Foundations of Sustainability*, ENVTL. F., Nov.-Dec. 2011, at 32, 32-33.

121. Org. of Econ. Cooperation and Dev., *Recommendation of the Council on Guiding Principles Concerning International Economic Aspects of Environmental Policies*, Annex, OECD Doc. C(72)128, (May 26, 1972).

122. *See id.*

123. INT'L ORG. FOR STANDARDIZATION, ENVIRONMENTAL MANAGEMENT: THE ISO 14000 FAMILY OF INTERNATIONAL STANDARDS (2009), *available at* http://www.iso.org/iso/theiso14000family_2009.pdf.

124. *See e.g.*, Marc Orlitzky et al., *Strategic Corporate Social Responsibility and Environmental Sustainability*, 50 BUS. & SOC'Y 6 (2011).

125. *See* UNEP FIN. INITIATIVE, UNIVERSAL OWNERSHIP: WHY ENVIRONMENTAL EXTERNALITIES MATTER TO INSTITUTIONAL INVESTORS 6-8 (2011), *available at* http://www.unepfi.org/fileadmin/documents/universal_ownership_full.pdf.

126. *Arch Coal to Pay $4 Million to Settle Clean Water Act Violations in Appalachian Mining* Operations, UNITED STATES DEP'T OF JUSTICE (Mar. 1, 2011), http://www.justice.gov/opa/pr/2011/March/11-enrd-257.html.

127. Jody Freeman & David Spence, *Should the Federal Government Regulate Fracking?*, WALL ST. J. (Apr. 12, 2013, 11:54 AM), http://online.wsj.com/article/SB10001424127887323495104578314302738867078.html.

128. *See EPA Overregulation*, NAT'L ASS'N OF MANUFACTURERS, http://www.nam.org/Issues/Energy-and-Climate/EPA-Overregulation.aspx (last visited July 3, 2013).

129. *See* Carol Kocheisen, *Hearing Addresses Proposal to Exempt Military from Environmental*

to be opportunistic, useful selectively, and avoided when not wished for.

B. Morphing Sustainability's Meaning

These conflicted attitudes toward environmental law also are evident in the deliberations of nations. The UN first addressed questions of law and sustainability at the 1972 Stockholm Conference on the Human Environment.[130] That Conference launched the UN Environment Programme to monitor and report on global environmental conditions and to assist developing nations to build their capacity to cope with environmental challenges.[131] In the 1980s, nations created the UN Convention on the Law of the Sea, and added Part XII, establishing the duty to "protect" the marine environment.[132]

Despite the establishment of UN Environment Programme after 1972, responding to the UNEP's reports was not a high priority for foreign ministries.[133] To build support for global environmental action, in 1985 the UN General Assembly created the World Commission on Environment and Development (no longer just the "human environment"), which produced in 1987 the seminally important report *Our Common Future*.[134] Chaired by Norway's Prime Minister, Mrs. Gro Harlem Brundtland, this Commission documented the escalating trends of environmental degradation world-wide, including the growing depletion of Earth's natural resources, and produced the call for "sustainable development," founded on concepts of inter-generational equity.[135] *Our Common Future* encouraged cooperation and measurable protection of Earth's natural systems, and in its appendix spelled out the need for new environmental law principles.[136]

Stimulated by the Brundtland Commission, nations in the UN General Assembly decided to convene the UN's World Conference on Environment and Development.[137] In 1991, a preparatory committee open to all UN Member States

---

Laws, NATION'S CITIES WKLY., Apr. 7, 2003, at 3.

130. United Nations Conference on the Human Environment, June 5-16, 1972, *Declaration of the United Nations Conference on the Human Environment*, 3, 5, U.N. Doc. A/CONF.48/14/Rev.1 (June 16, 1972).

131. G.A. Res. 2997 (XXVII), U.N. Doc. A/8901 (Dec. 15, 1972).

132. United Nations Convention on the Law of the Sea, *supra* note 61, art. 192.

133. Nicholas A. Robinson, *Befogged Vision: International Environmental Governance A Decade After Rio*, 27 WM. & MARY ENVTL. L. & POL'Y REV. 299, 309 (2002) [hereinafter Robinson, *Befogged*]; Jodie Hierlmeier, Note, *UNEP: Retrospect and Prospect—Options for Reforming the Global Environmental Governance Regime*, 14 GEO. INT'L ENVTL. L. REV. 767, 779-80 (2002).

134. OUR COMMON FUTURE, *supra* note 54, at 26-27. This report was prepared under the inspired leadership of Norway's Prime Minister, Mrs. Gro Harlem Bruntlund, with the Canadian James McNeill for the Commission's small Secretariat. Marc Pallemaerts, *International Environmental Law in the Age of Sustainable Development: A Critical Assessment of the UNCED Process*, 15 J.L. & COM. 623, 627-29 (1996).

135. OUR COMMON FUTURE, *supra* note 54, at 43-45.

136. *Id.* at 286-89.

137. Aphrodite Smagadi, *Analysis of the Objectives of the Convention on Biological Diversity: Their Interrelation and Implementation Guidance for Access and Benefit Sharing*, 31 COLUM. J. ENVTL. L. 243, 257-59 (2006).

was convened, chaired by Ambassador and Professor Tommy Koh, the distinguished Singaporean Ambassador who had chaired parts of the UN Conference on the Law of the Sea a decade before.[138] Ambassador Koh went on to chair the 1992 Rio Conference on Environment and Development itself.[139] Under his leadership the "Prep Comm" for UNCED prepared a set of draft Principles on Environment and Development, where they were to be refined and adopted at UNCED itself in Rio.[140] At UNCED, no nation dared, or cared enough to tamper with draft Declaration of principles, which the Conference, and then the United Nations General Assembly, duly adopted.[141] It is remarkable that UNCED ignored the principles of the Declaration while drafting *Agenda 21*, UNCED's blueprint of recommendations for sustainable development.[142] *Agenda 21* also deleted references to theme of environmental law, and called in Chapter 8 of *Agenda 21* for improved laws *for environment and development.*[143] States also eliminated all references to the cost of capacity building for sustainable development, and to global energy needs.[144] In 1992, too many delegates feared that environmental law would restrict socio-economic development, and too few wished to pay for new governance capacity needed to avert externalities.[145]

For the next decade, national implementation of *Agenda 21* was uneven and often slow.[146] To encourage international cooperation toward sustainable development, the UN General Assembly convened another summit meeting.[147] At

---

138. Akiho Shibata, *International Law—Making Process in the United Nations: Comparative Analysis of UNCED and UNCLOS III*, 24 CAL. W. INT'L L.J. 17, 20-21 (1993).

139. Jeffrey D. Kovar, *A Short Guide to the Rio Declaration*, 4 COLO. J. INT'L ENVTL. L. & POL'Y 119, 122, 139 (1993).

140. Pallemaerts, *supra* note 134, at 625-26; Shibata, *supra* note 138, at 20.

141. Pallemaerts, *supra* note 134, at 625-26.

142. *Compare, e.g.*, Principle 2 of the Declaration articulates that based on "principles of international law . . . [states have] the responsibility to ensure activities within their jurisdiction or control do not cause damage to the environment of other States or areas beyond the limits of national jurisdiction." *Rio Declaration*, *supra* note 47, *with* AGENDA 21, *supra* note 63 (that fails to include these principles of international law).

143. AGENDA 21, *supra* note 63, ¶ 8.14.

> While there is continuous need for law improvement in all countries, many developing countries have been affected by shortcomings of laws and regulations. To effectively integrate environment and development in the policies and practices of each country, it is essential to develop and implement integrated, enforceable and effective laws and regulations that are based upon sound social, ecological, economic and scientific principles.

Id. (this call for improved laws fails to acknowledge established environmental law).

144. *See* DERNBACH, *supra* note 75, at 41-45 (highlighting the failure of the U.S. Federal government to develop a sustainable regime in the 20 years following the Rio Summit).

145. *See* Nicholas A. Robinson, *"Colloquium: The Rio Environmental Law Treaties" IUCN'S Proposed Covenant on Environment & Development*, 13 PACE ENVTL. L. REV. 133, 156-57 (1995) [hereinafter Robinson, *"Colloquium"*].

146. *See* S. Jacob Scherr & R. Juge Gregg, *Johannesburg and Beyond: The 2002 World Summit on Sustainable Development and the Rise of Partnerships*, 18 GEO. INT'L ENVTL. L. REV. 425, 429-33 (2006).

147. *Id.* at 425-26, 435-36.

the 2002 Johannesburg UN World Summit on Sustainable Development, useful recommendations for national laws on energy were agreed, and this omission from *Agenda 21* was corrected.[148] The nations further agreed, in the Declaration of Johannesburg, that sustainable development rested on three pillars: the economic pillar, the social pillar, and the pillar of environmental protection.[149] Little note was taken about the fact that each of these three pillars was vastly different in size and priority. The Brundtland Commission's foundational premise, based on inter-generation equity, was not focused upon at the WSSD.[150] Principles of law were generally ignored in the debates; indeed, the sentence in the Johannesburg Plan of Implementation that states, "[w]e acknowledge the importance of ethics for sustainable development," had been expunged by the drafting Bureau from each preparatory draft text, until the plenary, where it was re-inserted and adopted.[151]

If this short history illustrates anything, it is that nations remain unsure of what environmental sustainability means. Nations act as if it is understood, but few have revised their settle practices and "business as usual" to establish patterns of long-term sustainability.[152] What concepts symbolize the political meaning of sustainability in international legal policy?

Is the concept essentially two-fold: environment and development? Or, is it like three separate pillars, a three-fold concept: economic growth, with social dimensions, and environmental protections? If these three currently unequal pillars are to have equal architectural dimensions, when will nations invest in making the social and environmental pillars proportionally the same as the economic pillar? States acknowledge the role of environmental law in codifying social norms and ethics, but governments barely encouraged environmental law.[153] Does sustainability need law for each separate dimension, or is law to integrate the two-fold or three-fold aspects? How? Is law to provide a priority for either development or for environmental protection?

Throughout the years since 1992, governments and private capital investors and development oriented NGOs, such as those working to alleviate poverty, continue to have confidence in accepted "business as usual" models.[154] Inertia about implementing *Agenda 21* is not their concern.[155] The continuing economic growth patterns of the past century, based on exploiting nature and maximizing

148. *Id.* at 435-39.

149. Alhaji B.M. Marong, *From Rio to Johannesburg: Reflections on the Role of International Legal Norms in Sustainable Development*, 16 GEO. INT'L ENVTL. L. REV. 21, 31 (2003).

150. *Id.* at 30-31.

151. World Summit on Sustainable Development, Aug. 26-Sept. 4, 2002, *Plan of Implementation of the World Summit on Sustainable Development*, ¶ 6, U.N. Doc. A/Conf.199/20; Robinson, *Befogged*, *supra* note 133, at 318.

152. *See* Scherr & Gregg, *supra* note 146, at 447-52.

153. *See* Robinson, *Befogged*, *supra* note 133, at 323-25.

154. Ved P. Nanda, *Sustainable Development, International Trade and the DOHA Agenda for Development*, 8 Chap. L. Rev. 53, 64-69 (2005).

155. Robinson, *Befogged*, *supra* note 133, at 356-57.

short-term profits through reliance on conscious or unconscious externalities, remain largely unchanged.[156] Norms for sustainability, or regulations of environmental law, temper the impacts of adverse environmental degradation, but do not stop it.

Lacking a clear international policy concept of the dimensions of sustainable development, the nation states have allowed "business as usual" to continue on, in whatever unsustainable ways emerge.

IV. TODAY'S ANTHROPOCENE EPOCH: AN ARENA FOR "SUSTAINABILITY" LAW?

While the global economy has grown enormously since 1945, and although major economic regions remains today in recession, nations seek to stimulate further growth. At the same time, the ecological foundations for economic "business as usual" are eroding.[157] Scientific studies of Earth's systems are more advanced than ever, and yet despite the best efforts of scientists in national academies of science, or the Intergovernmental Panel on Climate Change,[158] or the Millennium Ecosystem Assessment,[159] or the expert Commissions of IUCN,[160] most governments have no systems to react to the scientific reports.[161] They neglect to include scientific findings about Earth's degraded conditions into their policies and practices. For example, in the USA, the annual reports of the President's Council on Environmental Quality ("CEQ") for more than 25 years focused on the President and Congress pressing environmental issues, but despite the legal duty to prepare these reports,[162] no report has been issued since 1998.[163] Government policy is made without regard to what we know about lapses in environmental health, for humans and ecosystems alike.

Scientific reports in the issue of *Nature* delivered to Rio+20 report that degradation of Earth's natural systems is compounded enormously since the days of George Perkins Marsh.[164] The IPCC 4th Assessment Report conservatively

156. Marong, *supra* note 149, at 33-37.

157. *See* Rebecca M. Bratspies, *Sustainability: Can Law Meet the Challenge?*, 34 SUFFOLK TRANSNAT'L L. REV. 283, 283-84 (2011).

158. *See* INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, CLIMATE CHANGE 2007: SYNTHESIS REPORT 56-62 (2008), *available at* http://www.ipcc.ch/publications_and_data/publications_ipcc_fourth_assessment_report_synthesis_report.htm [hereinafter IPCC 2007 Report].

159. *See* MILLENNIUM ECOSYSTEM ASSESSMENT, ECOSYSTEMS AND HUMAN WELL-BEING: SYNTHESIS 1-24 (2005), *available at* http://www.millenniumassessment.org/documents/document.356.aspx.pdf [hereinafter MEA].

160. *See* INT'L UNION FOR CONSERVATION OF NATURE, IUCN RED LIST CATEGORIES AND CRITERIA 1 (2d ed. 2012), *available at* http://data.iucn.org/dbtw-wpd/edocs/RL-2001-001-2nd.pdf [hereinafter IUCN].

161. *See* Bratspies, *supra* note 157, at 296-97.

162. National Environmental Protection Act of 1969, 42 U.S.C. § 4321 (2012).

163. Frederick W. Stoss, *Environmental Quality: A Great Disappearing Act*, ELECTRONIC GREEN J., http://www.escholarship.org/uc/item/7x66w8kq#page-1 (last visited Aug. 23, 2013).

164. *See* Natasha Gilbert, *World Governments Establish Biodiversity Panel*, NATURE (Apr. 23 2013), http://0-www.nature.com.bianca.penlib.du.edu/news/world-governments-establish-biodiversity-

restates the findings of scientific inquires worldwide. The melting of the cryosphere, the rise of sea levels, the increase of atmospheric carbon dioxide, and the consequential changes in ambient temperatures of air and oceans are real. Rates of socio-economic growth in the past 60 years are historically unprecedented in all sectors measured, including human immigration into mega-cities. These trends seem gradual and distant from our daily lives, until a mega-storm like Sandy brings the impact home. If we take the long-view in geological perspectives, the 40,000 years of human evolution, and the colonization of the Earth by the human species during the Holocene, was a time of relative quiet. With new climatic conditions, more disruptions are forecasted.[165]

The International Commission on Stratigraphy will offer its own scientific assessment about whether humans irreversibly and measurably have altered the Earth. This time the reports will be in terms of classifying epochs of geological time.[166] Noting empirical evidence of impacts caused by the rapid economic growth and accompanying environmental degradation since World War II, ecologist Eugene Stroemer,[167] Paul J. Crutzen, a Nobel laureate for his studies of photochemistry of ozone in the stratosphere, historian John R. McNeill, author of *Something New Under the Sun: An Environmental History of the Twentieth-Century*, and Will Steffen, whose work has illuminated the science of Earth Systems, have each proposed that the Earth has left the Holocene Epoch and entered a new epoch.[168] They note how recent exponential changes in human activity in many sectors are leaving a permanent marker evident in Earth's rocks and soils, which has never been seen in the prior 10,000-14,000 years of the Holocene epoch.[169] Cruzen and his colleagues call the onset of this new epoch the "Great Acceleration" and ask, "Are Humans Now Overwhelming the Great Forces of Nature?"[170] The Commission on Stratigraphy is asked to assess whether humans have created on Earth a new epoch in geological time, "The Anthropocene."[171]

The evidence that the International Commission on Stratigraphy is studying is diverse. Physical characteristics mark the transition from one epoch to another, such as the melting of the cryosphere, the changes in the nitrogen and carbon

---

panel-1.10505.

165. *Future Climate Change*, EPA, http://www.epa.gov/climatechange/science/future.html (last updated June 21, 2013).

166. The scientific dimensions of this shift to a new epoch are for the International Commission on Stratigraphy to determine whether a new epoch of geological time has supplanted the Holocene. *Working Group on the 'Anthropocene'*, SUBCOMMISSION ON QUATERNARY STRATIGRAPHY, http://quaternary.stratigraphy.org/workinggroups/anthropocene (last updated Aug. 1, 2013).

167. Paul J. Crutzen & Eugene F. Stoermer, *The "Anthropocene,"* GLOBAL CHANGE NEWSLETTER, May 2000, at 17, 17-18.

168. *E.g.*, Will Steffen, Paul J. Crutzen, & John R. McNeill, *The Anthropocene: Are Human Now Overwhelming the Great Forces of Nature?*, 36 AMBIO 614, 614 (2007).

169. *Id.*

170. *Id.*

171. *See* SUBCOMMISSION ON QUATERNARY STRATIGRAPHY, *supra* note 166 .

cycles, acidification of the oceans as they absorb carbon dioxide, the changes in the hydrologic cycle, the new coastlines being shaped by rising sea levels, the interrupted trend toward any recurrence of an ice age, markers of radioactivity left from atmospheric weapons testing, the appearance of new chemicals not seen in prior epoch, chemicals synthesized by human technology and discarded around the world as wastes, and the disappearance of many species due to their extinction of species.[172]

It seems that humans have so irretrievably altered the Earth that the Commission may well find that a new epoch of geological time has begun. Conditions on Earth during this new epoch will call for humans to adapt legal principles and practices different from those that humanity learned during the Holocene Epoch. All sectors of society now need to assess how the effects of human change to the Earth are profoundly altering every socio-economic and management system. Assumptions about "business as usual" may no longer prove sound in the Anthropocene. Law, whether about sustainability or the environment, may need to be transformative, not merely prescriptive, to build a human stewardship of natural systems. More agreed treaties and statutes may be less important than devoting time to reshaping public environmental decision-making processes and adapting environmental management systems.

But how will this happen? Human society will need to look beyond the received wisdom of our past and present legal systems. Law reform will need to build upon evolved traits of human nature, and articulate stronger foundations for adapting, consistently in all societies, to Earth's new dynamic conditions. A new conception of socio-ecological sustainability should emerge. There are three fundamental principles that can guide these adaptive new paths forward: cooperation, appreciation, and resilience. Each will be discussed below. First, however, a discussion of socio-ecological sustainability will provide context.

A. Socio-Ecological Sustainability

From the perspective of understanding legal foundations for sustainability, the Anthropocene requires humans to study anew the very foundations of human society. Humans need ask: what norms may offer the best prospects of coping with the uncertain conditions of the Anthropocene? How should environmental law adapt in this era of time of great acceleration? Given that the nature of human nature continues, what should human society and governance do when confronted with the uncertain change and new ambient conditions of the Anthropocene? Society is back to articulating its first principles.

Put starkly, extreme storms, such as mega-storm Hurricane Sandy, back-to-back Hurricanes Katrina and Rita, tornados that destroy towns in the middle of the USA, or the vast repeated floods that in two years destroyed 50 years of sustain

172. *E.g.*, James Owen, *New Earth Epoch Has Begun, Scientists Say*, NAT'L GEOGRAPHIC (Apr. 6, 2010), http://news.nationalgeographic.com/news/2010/04/100406-new-earth-epoch-geologic-age-anthropocene.

socio-economic development in Pakistan's Indus River Valley,[173] require rebuilding from scratch. What model is to be used? When sea level rise removes 20% of the delta in Bangladesh, or encroaches on coastal communities world-wide, when do "business as usual" models become so stressed out that they break? What answers can laws about sustainability or current environmental laws provide? What norms should guide adaptive reform of such laws?

What exactly should international and national environmental law consider doing anew to evolve a legal system for the Anthropocene? This question may be usefully examined in two dimensions. First, what fundamental principles of law should guide and inform the coming new evolution of environmental law? Second, in light of those basic norms, what changes are needed in existing environmental laws and methods? This paper can only hint at what further studies these two questions may produce. Since the change in the Anthropocene will envelop every aspect of human endeavor, humans can hardly know what will be required. All humans now are embarked on an exploration into a new dimension of life on Earth.

Each sector necessarily will make this assessment in light of its needs and insights. Remote sensing of the Earth's nature; along with systems and vast computer capacities to address large amounts of data about change, can give us a chance to perceive what is happening, and to measure whether our remedial legal measures are working.[174] Globally, this requires a re-iterative assessment, with different geographic regions and their legal systems sharing their respective insight with others, and different sectors of ecology, technology, or economy doing the same. A matrix analysis may be useful, but we are not yet so far advanced into understanding the Anthropocene to say how studies, much less reforms in behavior, can best proceed. Nonetheless, it is evident that we have begun a new era of systemic analysis about law, society, ecology, and the foundational principles of society.[175] If environmental law believes in public participation in environmental decision-making,[176] and prior informed consent,[177] than a massive

173. Armando Lamadrid, *The 2010 Indus River Flood*, CICERO SENTER FOR KLIMAFORSKNING (Aug. 26, 2010), http://www.cicero.uio.no/webnews/index.aspx?id=11421&lang=no ("These unusually heavy rains caused a monumental flood on a scale larger than anything seen since the Chong Khumdan Glacier jökullhaup of 1929. At Guddu Barrage bordering Punjab and Sindh provinces, peak discharge occurred on August 8-9, reaching 32,600 cumecs, or roughly 10.5 times larger than the peak flow of the Glomma River at Elverum, Norway during the 1995 Vesleofsen flood. To date, the government of Pakistan reports 15.4 million people have been directly affected by the flood, more than the 2004 Asian tsunami, the 2005 Kashmir earthquake and the 2010 Haiti earthquake combined (UN OCHA 2010).").

174. *See* NAT'L PARK SERV., CLIMATE CHANGE RESPONSE STRATEGY 8 (2010).

175. *See, e.g.*, Carl J. Circo, *Does Sustainability Require a New Theory of Property Rights?*, 58 U. KAN. L. REV. 91, 98-99 (2009).

176. *Rio Declaration*, *supra* note 47 (referencing Principle 10) ("Environmental issues are best handled with the participation of all concerned citizens, at the relevant level.").

177. *Compare* Convention on Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade art. 1, Sept. 10, 1998, 2244 U.N.T.S. 337 [hereinafter Rotterdam Convention], *with* Bamoko Convention on the Ban on the Import into Africa and the Control of

new era of public education about global environmental change and sustainability is coming. Fortunately, tools in mass communication and social networking have evolved to let us do so, but does environmental law know how to engage these tools? How then shall we rethink basic principles of law about humans and nature? Three fundamental principles of law for the Anthropocene will help shape this discussion, in particular, to environmental law. These traits are: cooperation, appreciation, and resilience.

B. Three Fundamental General Principles of Law for the Anthropocene

Since human society has evolved significantly over the past 14,000 years of the Holocene, it is useful to consider what guidance Darwinian evolution may offer for this analysis of these principles. Three traits of evolved human nature that law builds upon may be noted. There are more yet to be explored. For example, much is known about the human instinct, and thirst, for justice; this informs our entire legal system. Here, we may focus on three traits relating more particularly to environmental law. First is the well-acknowledged human trait of cooperation, widely regarded as *Principle of Law of Cooperation*. Second, we may term the *Principle of Nature Appreciation,* or *Biophilia*; this is the human trait to appreciate beauty and wonder in nature and act to care for nature. This principle actively informs law and law-making (as discussed in the illustration of Enos Mills and national parks), but utilitarian perspectives often discount it since any agreement about whether or not it has monetary value is often illusive. Third is the human and ecological trait of resilience, which is not yet widely recognized as a legal principle, but which in fact operates as a general principle of law and which should be embraced as the *Principle of Resilience.* We may explore briefly each of them in turn.

1. The Principle of Cooperation

From their evolved capacity for appreciating nature, humans can also seek to maximize the trait of "cooperation," and make more pervasive use of the principle of cooperation. The duty to cooperate is a universally accepted principle of international law, for example included as Articles 55 and 56 in Chapter IX of the United Nations Charter.[178] The entire nation-state system is based on the principle of cooperation. Within local communities, humans cooperate not because they are ordered to do so, but because it is fulfilling and they wish to do so. The recognition is ancient; for example, in *The Analects* (Book 15, chapter 23) of Confucius, it is written, "'Is there one word which may serve as a rule of practice all one's life?' The Master said, 'Is not RECIPROCITY such a word?'"[179]

Transboundary Movement and Management of Hazardous Wastes within Africa art. 6, Jan. 30, 1991, 2101 U.N.T.S. 177.

178. U.N. Charter arts. 55, 56.

179. THE FOUR BOOKS: CONFUCIAN ANALECTS, THE GREAT LEARNING, THE DOCTRINE OF THE MEAN, AND THE WORKS OF MENCIUS 229 (James Legge trans., The Chinese Book Co. 1930) (n.d.).

Cooperation is both an ethical norm and a duty of good neighborliness, acknowledged to be a customary norm in all legal systems (e.g. *droit de voisinage*).[180] When a neighbor's barn burns, others rally together to help build a new barn. As societies cope with the accelerating physical changes in the Earth's Biosphere, cooperation can make it possible to muddle through. Governments and individuals alike instinctively cooperate when providing mutual aid for disaster relief, for example amidst the intense storm impacts induced by "climate change." Mutual aid agreements provide the basis for fighting fires and supplying sister governments in time of great need.[181]

The evolutionary foundations for cooperation are explored by Samuel Bowles and Herbert Gintis, who find that the human capacity for cooperation is an evolved human characteristic.[182] Mark Pagel's history of cooperation corroborates this view.[183] Since humans are "hard wired" to cooperate, environmental law can draw vitality by relying more explicitly on this ancient rule of reciprocity. In the future, environmental law will need to do more to frame procedures to promote cooperation, promote trust, and expand human awareness of reciprocity to include other animals and ecosystems. Cooperation stems from compassion. Cultural ethics can broaden the scope of compassion, and laws can encourage a needed collective vision: "we are all in this together." This principle, when envisioned to encompass its widest scope as Aldo Leopold conceived in the "land ethic," can foster cooperation with the community of life.[184]

It must be acknowledged that designing laws to give primacy to cooperation will not be easy. Corruption, greed, and bias undermine the cooperative instincts. Cooperation may be extended narrowly, to one's immediate clan or nation and may not be applied when needed, as in denying access to refugees or environmentally displaced persons, or other migrants. Patterns of cooperation may be compromised when induced or encouraged principally through economic incentives or sanctions, as Elinor Ostrom has noted.[185] When common property rights can be defined and linked to participatory governance, through councils of stakeholders to manage the cooperative use of resources, the result can be a regime that builds effective cooperation among all who use a specific commons. This sort of environmental law innovation is being established in England and Wales

180. JAMES C. SMITH & JACQUELINE P. HAND, NEIGHBORING PROPERTY OWNERS § 1:1 (1988).

181. Nicholas A. Robinson, *Forest Fires as a Common International Concern: Precedents for the Progressive Development of International Environmental Law*, 18 PACE ENVTL. L. REV. 459, 490 (2001).

182. SAMUEL BOWLES & HERBERT GINTIS, A COOPERATIVE SPECIES: HUMAN RECIPROCITY AND ITS EVOLUTION 4 (2011).

183. *See* MARK PAGEL, WIRED FOR CULTURE: THE NATURAL HISTORY OF HUMAN CO-OPERATION (2012).

184. *See* STANISLAV E. SHMELEV, ECOLOGICAL ECONOMICS: SUSTAINABILITY IN PRACTICE 36 (2012) (referencing ALDO LEOPOLD, A SAND COUNTY ALMANAC AND SKETCHES HERE AND THERE (1949)).

185. *See* ELINOR OSRTROM, GOVERNING THE COMMONS: THE EVOLUTION OF INSTITUTIONS FOR COLLECTIVE ACTION 2-6 (1990).

through the Commons Act of 2006.[186]

Environmental law more widely can acknowledge and enhance human capacities for cooperatively coping with the effects of global change. When laws require more extensive environmental studies and mandate sharing environmental information with the public, governments will find a consensus exists for environmental stewardship mandates. Conversely, when public participation in environmental decision-making is uninformed, or limited in scope, brittle and shortsighted actions result.[187] In terms of sustaining the well being of humans and animals and ecosystems, the effectiveness of environmental law performance requires the use of metrics.[188] Environmental statistics will become more important than economic indicators. Only by learning about changing environmental conditions can people prepare for adaptation.

The ranks of ethically informed citizen scientists must grow and be enlisted in gathering and disseminating data and making assessments. Public knowledge about ambient environmental conditions will need to include information on all flora and fauna and ecosystems, and have a holistic focus. We cannot know what is important until we study it, and we need to understand nature, locally as well as globally, to feel a part of nature, and share concerns for nature's well-being. As Aldo Leopold observed, "[t]he shallow-minded modern who has lost his rootage in the land assumes that he has already discovered what is important."[189] He continued that "all history consists of successive excursions from a single starting-point, to which man returns again and again to organize yet another search for a durable scale of values."[190]

Yet cooperation need not always work in sustainable ways. We cooperate well to perpetuate "business as usual." So, what further principle should guide our natural tendency to cooperate in ways that sustain life on Earth? This guidance comes from acknowledging the link between nature and humans. Recalibrating how we apply our values about nature during the changing disruptions of the Anthropocene requires flexibility and being open to accepting what the biologist E.O. Wilson calls "*biophilia.*"[191]

2. The Nature Appreciation Principle

Environmental law is significantly guided by what science has learned about human and ecological conditions. To shift from "business as usual" economic

186. *See* Commons Act, 2006, c. 26, § 2 (U.K.).

187. *See* Marion Hourdequin et al., *Ethical Implications of Democratic Theory for U.S. Public Participation in Environmental Impact Assessment*, 35 ENVTL. IMPACT ASSESSMENT REV. 37, 39 (2012).

188. *See Environmental Performance Index*, YALE CTR. FOR ENVTL. L. & POL'Y, http://envirocenter.yale.edu/programs/environmental-performance-management/environmental-performance-index (last visited Aug. 26, 2013).

189. LEOPOLD, *supra* note 53, at 256.

190. *Id.*

191. EDWARD O. WILSON, BIOPHILIA 1 (1984).

patterns that unsustainably consume natural systems or their products, humans can be motivated from their inspiration found in nature. Humans establish parklands not for economic growth, but for recreation and spiritual pleasure.[192] Governments establish wildlife refuges to safeguard places for animal reproduction, not consumption, and fish and game seasons are set to strictly ration any culling of species. Humans delight in nature. Humans as a species have evolved to appreciate "play," and we evolve our norms for "fair play" as well as for creativity in the arts; in turn our laws encourage us to play in nature. Environmental laws can do more to build parks, plant trees, establish walking paths, save habitats, and carve out space for animals conveniently to cohabit watersheds with humans. In doing so, we restore our positive instincts about nature.

Much of nature conservation law grows out of this principle.[193] It has as much claim on the political discoursed, as does the right to life. It is one aspect of the broader right to the environment, acknowledged in many Constitutions abroad and articulated in Supreme Court decisions in India,[194] in the Philippines[195] and elsewhere. It underpins the first legal wilderness in the world, New York State's "forever wild" Forest Preserve in Article XIV of the New York State Constitution.[196] It provides the foundation for every local, state, provincial, national, or transnational park world-wide.[197] No international law mandates the establishment of parklands.[198] Human nature does.

Amidst the challenges of the Anthropocene, humans will need to act affirmatively in order to make space for *in situ* habitats for other species. Given extinction trends, humans also will need to expand *ex situ* preservation of species, as habitats are lost. Biological diversity and the health of ecosystems are enhanced by preserving species.

Humans are motivated to care for nature also because of spiritual values.[199] All religions support stewardship of God's creation, and reverence of life.[200] Each great religion provides for respecting and loving God's creation in nature.

---

192. ENOS A. MILLS, THE ROCKY MOUNTAIN WONDERLAND 325-26 (1915).

193. *See, e.g.*, 16 U.S.C. §§ 1361(6), 1531(a)(5), 4901(3) (2012).

194. *See, e.g.*, M.C. Mehta v. Union of India, (2004) 12 S.C.C. 118 (India).

195. *See, e.g.*, Oposa v. Factoran, G.R. No. 101083 (S.C., July 30, 1993) (Phil.), *available at* http://www1.umn.edu/humanrts/research/Philippines/Oposa%20v%20Factoran,%20GR%20No.%2010 1083,%20July%2030,%201993,%20on%20the%20State's%20Responsibility%20To%20Protect%20the %20Right%20To%20Live%20in%20a%20Healthy%20Environment.pdf.

196. N.Y. CONST. art. XIV, § 1.

197. *See* Denise E. Antolini, *National Park Law in the U.S.: Conservation, Conflict, and Centennial Values*, 33 WM. & MARY ENVTL. L. & POL'Y REV. 851, 855 (2009).

198. *See* Nele Matz, *Protected Areas in International Nature Conservation Law: Can States Obtain Compensation for their Establishment?*, 63 HEIDELBERG J. INT'L L. 693, 697 (2003).

199. *See* Mary Evelyn Tucker & John Grim. *The Challenge of the Environmental Crisis*, THE F. ON RELIGION & ECOLOGY AT YALE, http://fore.research.yale.edu/publications/books/cswr/the-challenge-of-the-environmental-crisis (last visited Aug. 26, 2013).

200. *See id.*

Consider, for example, the analyses of historian and theologian Thomas Berry[201] and Mary Evelyn Tucker's seminal works on each of the world religions.[202] There are both religious and evolutionary foundations for believing that humans will support expanding legal measures for restoring and adapting nature to the exigencies of the Anthropocene. Robert N. Bellah has recently completed a magisterial study that grounds the human needs for religious belief and motivation in evolution.[203] The human foundations for the *Principle of Nature Appreciation*, or *Biophilia*, are articulated by ecologist Edward O. Wilson,[204] and practical applications of the Appreciation of Nature Principle to supplant less sustainable "business as usual" practices exist, such as in building design as elaborated by Stephen R. Kellert.[205]

Humans already know how to enact provisions based on this Principle into laws and regulations, and to enhance care for animals, plants, and ecosystems.[206] Devoting more explicit recognition to this Principle of Nature Appreciation can build public support for environmental conservation laws, and encourage governments to assign greater priority to laws and practices respecting the intrinsic value of animals and nature apart from human uses. When this principle is combined with the science of ecology, it provides a basis for winning public acceptance of methods and practices for ecosystem management. Reliance on this principle may also help mend an intellectual rift: people who oppose environmental regulation of water and air emission discharges on economic grounds (preferring the benefit from externalities that do not affect them immediately) often also support laws for parks and *ex situ* zoological gardens.[207] A window is opened to expanding and deepening the understanding of how this principle may be is applied across all conditions of the Anthropocene.

Once we are motivated to adapt our human ways to conscientiously sustain life around us, we perceive that we can draw on other evolved traits of human nature and indeed biological systems, to find resources and strength to carry on.

---

201. *See* THOMAS BERRY, THE GREAT WORK: OUR WAY INTO THE FUTURE 22-24 (1999).

202. *See, e.g.*, MARY EVELYN TUCKER & JOHN GRIM, ECOLOGY AND RELIGION (forthcoming 2013).

203. ROBERT N. BELLAH, RELIGION IN HUMAN EVOLUTION: FROM THE PALEOLITHIC TO THE AXIAL AGE 45 (2011).

204. WILSON, *supra* note 191.

205. *See* STEPHEN R. KELLERT ET AL., BIOPHILIC DESIGN: THE THEORY, SCIENCE, AND PRACTICE OF BRINGING BUILDINGS TO LIFE 6-9 (2008).

206. *See, e.g.*, U.S.C. §§ 1361, 1531, 4901 (2012).

207. *See, e.g.*, Eric Lichtblau & Jad Mouawad, *Oil Companies Weigh Strategies to Fend Off Tougher Regulations*, N.Y. TIMES (June 2, 2010), http://www.nytimes.com/2010/06/03/us/03lobby.html (discussing big oil's plans to fight regulation following the BP oil spill with ExxonMobil, Valero Energy, and Chevron leading the push). *See also, e.g.*, HOUSTON ZOO, 2012 SEASONS OF CHANGE: ANNUAL REPORT 30-32 (2012) (demonstrating that ExxonMobil, Valero Energy, and Chevron each made contributions to the Houston Zoo in 2012); *ExxonMobil Endangered Tiger Habitat*, DALL. ZOO, http://www.dallaszoo.com/press-exxonmobil-tigers (last visited Oct. 23, 2013) (highlighting ExxonMobil's $4.5 million donation to the Dallas Zoo).

Chief among these is the principle of resilience.

3. The Principle of Resilience

Cooperation alone, even when motivated by biophilia, needs a focus; what sort of care do we cooperate to attain? If humans are to cope well in the Anthropocene, their laws and customs and indeed all cultural systems will need to make explicit efforts to promote human and ecological *resilience.* Society should formally recognize the virtue of resilience and consciously bolster it by mandating measures to sustain resilience. Human society takes for granted that humans have reliance as an innate trait of human nature.[208] Law, however, rarely recognizes or values resilience today as a legal concept.[209] Since vastly more resilience will be needed amidst the surprises and disruptions of the Anthropocene, this omission to accord a legal status to resilience needs to be redressed.

The "business as usual" that favors economic efficiency leaves many commercial and social systems less resilient. For example, companies order components in their supply chain at the last minute in order to avoid costs of stockpiling them.[210] As companies outsource services or manufacturing of components, they lose the internal capacity to meet their own needs. Similarly many cities have a reserve of potable water insufficient for all their needs; they pray that nature will provide. Hospitals tend to maintain limited supplies of medicines, which can become depleted in times of widespread need, when medical supplies are not always available, and pharmaceutical companies manufacture only to meet market demands.

Resilience is lacking in other spheres as well. Most of the world does not have any system of casualty insurance in order to recover from severe storm events, such as witnessed in the Indus River Valley's devastation in 2010, or in late 2011 when three typhoons consecutively hit the Philippines and then Southeast Asia flooding an area the size of Spain, inundating most of Bangkok.[211] Lacking insurance laws, the financing to rebuild after disasters falls to governments, and governments lack the tax base or resources to engage in widespread rebuilding.[212] Past and current economic models assume past investments in infrastructure afford a basis for further growth; that model is now suspect.[213] After climate induced

208. *See* Lia Helena Monteiro de Lima Demange, The Principle of Resilience 22 (Nov. 28, 2011) (unpublished LL.M. thesis, Pace University School of Law), *available at* http://digitalcommons.pace.edu/lawdissertations/10.

209. *See id.* at 19.

210. *See* Gerry Aubert, *Surplus Inventory: Avoid It, Identify It, Sell It*, INDUS. SUPPLY, http://www.industrialsupplymagazine.com/pages/Management---Surplus-inventory-Avoid-it,-identify-it,-sell-it.php (last visited Aug. 26, 2013).

211. *See* David Satterthwaite, *How Does a Changing Climate Impact on Urban Poverty?*, INT'L INST. FOR ENV'T & DEV. (Mar. 28, 2013), http://www.iied.org/how-does-changing-climate-impact-urban-poverty.

212. Dwight M. Jaffee & Thomas Russell, *Catastrophe Insurance, Capital Markets, and Uninsurable Risks*, 64 J. RISK & INS. 205, 206, 226-27 (1997).

213. Vytautas Snieska & Ineta Simkunaite, *Socio-Economic Impact of Infrastructure Investments*,

catastrophes, it is likely that only insurance systems can enable human settlements adapt to meet the needs of their community. Insurance builds resilience and provides a self-reliant foundation to sustain cooperation and make room for helping humans and animals alike.[214] Micro-insurance is being explored, for areas where poorer conditions persist. The poor should not be without access to insurance. Insurance builds resilience. It should be a global norm that every nation provides honest, transparent, affordable, and effective casualty insurance.

The Principle of Resilience can be restated in legal terms as a duty, "*states shall sustain and enhance characteristics of resilience within all systems under their jurisdiction or control.*"[215] This definition would extend to human socio-economic systems, ecosystems, and other nature phenomena such as hydrologic systems. When acknowledging this Principle of Resilience, governments would be obliged to establish and employ environmental managements systems, design redundancy into their operations,[216] and eschew practices that exhaust natural resources and degrade the environment. Promoting resilience would guide the environmental management systems toward finding sustainability in the Anthropocene.

Study of natural science illustrates the pervasiveness of resilience in nature.[217] For this reason, also, environmental law should acknowledge Principle of Resilience. To some extent it already does. Environmental Law fosters resilience when it protects wetland areas, which absorb floodwaters, recharge aquifers, and provide rich habitat for myriad species,[218] but rarely explicitly does so on the grounds that it is giving priority to sustaining ecological resilience.[219] If resilience were a foundation for wetlands laws, there would be a basis for protecting upland areas and entire watersheds beyond just the area of the protected wetland. Reliance narrowly on a utilitarian value of sustaining ecosystems serving as a basis for protecting wetlands is too narrow a legislative foundation, because it does not sufficiently acknowledge and enhance systemic resilience. A legal mandate to

---

ENGINEERING ECON., 19-20 (2009), *available at* http://internet.ktu.lt/lt/mokslas/zumalai/inzeko/63/1392-2758-2009-3-63-16.pdf.

214. INTERAGENCY CLIMATE CHANGE ADAPTATION TASK FORCE, FEDERAL ACTIONS FOR A CLIMATE RESILIENT NATION 11-12 (2011), *available at* http://www.whitehouse.gov/sites/default/files/microsites/ceq/2011_adaptation_progress_report.pdf.

215. Nicholas A. Robinson, *Rio+20 and Biodiversity: What Next? The International and Brazilian Perspectives* 4 (Pace Law Faculty Publ'n, Paper No. 883, 2013) (italics in original), *available at* http://digitalcommons.pace.edu/lawfaculty/883 [hereinafter Robinson, *What Next?*].

216. Consider the analogy to the precautionary principle, and the maxims about saving for a rainy day.

217. *See* Todd Swanstrom, *Regional Resilience: A Critical Examination of the Ecological Framework* 5 (Berkeley Inst. of Urban & Reg'l Dev., Working Paper No. 2008-07, 2008) (referencing C. S. Holling, *Resilience and the Stability of the Ecological systems*, 4 ANN. REV. ECOLOGY & SYSTEMATICS 1 (1973)), *available at* http://iurd.berkeley.edu/publications/wp/2008-07.pdf.

218. *See, e.g.*, N.Y. ENVTL. CONSERV. LAW § 24 (McKinney 2007) ("Freshwater Wetlands Act").

219. *See, e.g., id.* § 24-0103; N.Y. ENVTL. CONSERV. LAW § 25-0102 (McKinney 2007) ("Tidal Wetlands Act").

enhance resilience throughout a watershed, for example, could promote the design and construction of new wetlands or small bio-swales, to more fully absorb new floodwaters, and build new habitats.[220] New wetlands will need to be established as sea levels rise.

Growing dislocations accompanying this current period of the Anthropocene's "great acceleration" increasingly are disrupting human society.[221] More than disaster relief or "first aid" is required. Migration of people and animals has already begun, away from inundated coastal lowlands or floodplains, and to new habitats.[222] Today, the International Committee of the Red Cross makes providing humanitarian relief to environmental "refugees" among its top three priorities;[223] there are more of them than there are refugees from armed conflict today.[224] In all instances, there will be a need to promote the Principle of Resilience.

Further study of the role that resilience plays in evolutionary contexts may inform how the law might encourage or rely upon this trait. Law embraces a principle of resilience deriving it from that trait of human nature, which is to be resilient.[225] As individuals and as a species, humans are resilient. Beyond us there is resilience in ecosystems. Ecologists and social scientists have identified and elaborated this Principle of Resilience.[226] Resilience means being able to bounce back after a disturbance or being stretched to the limits; the Intergovernmental Panel on Climate Change defined resilience as the "[a]mount of change a system can undergo without changing state,"[227] and the UN Development Programme has termed it "a tendency to maintain integrity when subject to disturbance."[228] But resilience in law means re-stabilizing after the disturbance to rebuild the elements of integrity that are valued, as fully as possible, just as natural ecosystems reset a new balance within the elements that survive the disturbance.[229]

Human communities can evidence resilience, just as biological communities

---

220. NW. IND. REG'L PLANNING COMM'N, 2040 COMPREHENSIVE REGIONAL PLAN, CHAPTER III: ENVIRONMENT & GREEN INFRASTRUCTURE 48-50 (2011), *available at* http://www.nirpc.org/media/2940/ch.3_environmentgreeninfrastructure.pdf.

221. *See* Simon Dalby, Facing Global Environmental Change: Climate Change, Food Sovereignty, and Security in the Anthropocene 3, 5-6 (Feb. 17, 2009) (paper for presentation at International Studies Annual Convention), *available at* http://www.academia.edu/211668/Anthropocene_Security.

222. *See id.* at 8.

223. Robinson, *What Next?*, *supra* note 215, at 5.

224. *Environmental Refugees*, HARMONY FOUND., http://harmonyfdn.ca/?page_id=865 (last visited Aug. 28, 2013).

225. *See* Monteiro de Lima Demange, *supra* note 208, at 6.

226. *See* BRIAN WALKER & DAVID SALT, RESILIENCE THINKING: SUSTAINING ECOSYSTEMS AND PEOPLE IN A CHANGING WORLD (2006).

227. *See* CLIMATE CHANGE 2001: IMPACT, ADAPTATION, AND VULNERABILITY 993 (James J. McCarthy et al. eds., 2001), *available at* http://www.grida.no/publications/other/ipcc_tar.

228. *See* ELLINA LEVINA & DENNIS TIRPAK, ADAPTATION TO CLIMATE CHANGE: KEY TERMS 15 (2006), *available at* http://www.oecd.org/environment/cc/36736773.pdf.

229. *See id.*

do through ecosystems. The attributes of resilience can be studied and replicated.[230] Legal and other studies are needed to expand how expanding resilience can become the substance of process of environmental law.

Governmentally mandated environmental management systems should explicitly aim to enhance resilience, and metrics to track resilience can be developed. For example, cities that survive and prosper over generations, like London, Singapore, or New York, are said to be resilient.[231] Cities often compare and adopt each other's winning attributes.[232] Institutions with resilience re-invent themselves over time, such as great cities, universities, or religious orders.[233] Resilient systems embrace and adapt to changing conditions.[234] As a society adapts, it learns how to practice adaptation. After the first earthquake, a vase may be placed again on a shelf, but after the second it is placed on the floor. Societies forget at their peril. In Japan, stone tablets one meter high were erected to warn about Tsunami wave heights in 1611, but the tablets were ignored in Fukishima as coastal developments were built behind the false security of sea walls erected despite the tablets' message.[235] Resilient systems compensate for human tendencies toward complacency.

As humans plan to adapt to new conditions in the Anthropocene, they need to facilitate resilience throughout all sectors of human and natural systems alike. Is it not hubris to avoid fostering resilience just because we may be ignorant about how resilience works in nature? Aldo Leopold counseled not to discard the parts of the clock just because some seem useless to those with narrow vision.[236] Resilience can benefit all parts of an interdependent system, even if we do not comprehend. Resilience advises not to repeal or weaken environmental laws; back-sliding reduced resilience while it also violated the emerging legal Principle of Non-Regression.[237] Acting on the Principle of Resilience would refine the application of the Precautionary Principle. Just as we should not act to avert harm simply because we do not yet have full evidence that the harm will arise, we should also not avoid bolstering resilience because we do not see the immediate benefits of doing so. Resilience is a different, but related aspect of the Precautionary

230. *See id.* at 15-16.

231. PRICEWATERHOUSECOOPERS LLP, CITIES OF OPPORTUNITY 6, 10-11 (2012), *available at* http://www.pwc.com/us/en/cities-of-opportunity/assets/cities-opp-2012.pdf.

232. *See id.* at 34 (proposing that at the "end of [the] day, history is written by the winners, as George Orwell, Winston Churchill, and Napoleon said in one form or another—better to end up a flexible survivor than a magnificent dinosaur. The same aphorism goes for cities caught amid transformation").

233. *See* Swanstrom, *supra* note 217, at 5.

234. *See id.* at 1-2.

235. Martin Fackler, *Tsunami Warnings, Written in Stone*, N.Y. TIMES (Apr. 20, 2011), http://www.nytimes.com/2011/04/21/world/asia/21stones.html?pagewanted=all&_r=0.

236. *See* ALDO LEOPOLD, ROUND RIVER 146-47 (Luna B. Leopold ed., 1993) (1953).

237. *See* Michel Prieur, *De L'urgente Nécessité De Reconnaître Le Principe De "Non Régression" En Droit De L'Environnement*, 1 IUCN ACAD. ENVTL. L.J. 26-27, 29-31 (2011), http://www.iucnael.org/en/e-journal/previous-issues/157-issue-20111.html (Fr.).

Principle.[238]

Resilience fosters a durable sustainability.[239] For example, "land use" may seek to integrate resilience thinking beyond the static systems of spatial planning, such as town and country planning or zoning.[240] As sea levels rise and coastal land erodes, resilient adaptation in land use regimes will become the order of the day. Resilience can be a conscious criterion for planning. Beyond the needs of humans, planning should address the needs of ecosystems, plants, and animals. How shall human society make space for animals, and broadly for nature? What is natural integrity?[241] During rapidly changing physical conditions, it is difficult to know how to define this concept. We may want to provide space for natural systems to evolve and so shape the answer to this inquiry in a natural and organic way, rather than having humans predict and project an unavoidably incomplete answer. Human society perhaps does need to ask how it should encourage species in ecosystems with functioning systems and services. Alternative voices argue about human controls for endemic species or "alien" species or for creating "artificial" nature, or for preserving "wild" spaces or adapting to habitats changed by resident "alien" species. [242] But in a rapidly changing Earth, are not all species kindred and none alien? All species are moving from where each seems settled.

Before embracing one or another theory of how humans should combat alien species to "preserve" nature, resilience thinking suggests that we should redouble our study of natural systems.[243] Our preferences should be informed by scientific knowledge, in the wake of anticipated or experienced environmental disruptions. Might not embracing the Principle for Appreciation of Nature better stimulate collaborative and cooperative empirical studies about how humans may co-evolve more sympathetically with other species and ecosystems? Do we know what may be the essential functions or cycles of an ecosystem or its species after disruptions take place? Before acting on one or another vision about what human society wants its nature to be, should not the unknown complexity and resilience in evolved natural systems be accorded recognition and some deference?

Law can seek resilience by maximizing biological diversity so that space and time may be afforded for resilience in systems to let them evolve.[244] Is this

238. *See id.* at 31.

239. WALKER & SALT, *supra* note 226, at 37.

240. *See* ROBIN BLOCH, THE FUTURE OF WATER IN AFRICAN CITIES: WHY WASTE WATER? INTEGRATING URBAN PLANNING AND WATER MANAGEMENT IN SUB-SAHARAN AFRICA: BACKGROUND REPORT 29-32 (Michael Jacobsen et al. eds., 2012).

241. *See* NIGEL DUDLEY, AUTHENTICITY IN NATURE: MAKING CHOICES ABOUT THE NATURALNESS OF ECOSYSTEMS 137-39 (2011).

242. *See Invasive Species*, SECRETARIAT OF THE PAC. REGIONAL ENV'T PROGRAMME, http://www.sprep.org/Invasive-Species/bem-invasive-species (last visited Apr. 16, 2013).

243. *See* Theodore Mosquin, *Management Guidelines for Invasive Alien Species in Canada's National Parks*, ECOSPHERICS ETHICS § 1.0, http://www.ecospherics.net/AlienSpecnew.htm (last visited Apr. 16, 2013).

244. *See* Carl Zimmer, *Alien Species Reconsidered: Finding a Value in Non-Natives*, YALE ENV'T 360 (Feb. 24, 2011), http://e360.yale.edu/feature/alien_species_reconsidered_finding_a_value_in_non-

enough? Will even these values or studies provide a sufficient common approach toward building human ethics toward animals, individually or as species in ecosystems?

Recognizing and relying on the Principle of Resilience can stimulate and facilitate law reforms that enable humans, flora, and fauna to adapt to the changing conditions of the Anthropocene.[245] In finance law, bankruptcy regimes allow individuals to recover from upsets to their economic lives.[246] Casualty insurance laws provide means for individuals to recover from fires, floods, and droughts.[247] Environmental law needs to emulate these human regimes and create the legal means to assist flora and fauna to move on after disruptions. Resilience also provides justification for the Non-Regression Principle, and supports enactment of anti-backsliding laws, to avert regressions when legislators seek to repeal environmental stewardship laws. But averting the repeal of environmental laws, while *necessary*, does not itself oblige society to examine shortcomings in the laws' *sufficiency*. By acknowledging a duty to explore a capacity for resilience, we also must ask how to amend the law in order to enhance adaptive sustainability and foster resilience. Resilience laws build redundancy and buffers to facilitate recovery from disruptions.

V. LAW REFORMS FOR SUSTAINABLY MUDDLING THROUGH THE ANTHROPOCENE

Embracing these three basic principles of law could be transformative, since the law would come to give equal consideration to the basic needs of humans and nature alike. Cooperation among humans would extend to sustaining the natural communities of life in which humans are embedded. By building resilience for sustaining natural systems, we sustain human systems.[248] The "business as usual" laws need to be systematically reassessed. If this is not done in a prophylactic way, in advance of disruption, there will be greater disruptions. It is understandably more difficult to redesign laws, with scarcer resources to do so, after experiencing the tragedy of disaster. However, it may also be that the consensus to pursue reforms may only merge after a disaster, because entrenched "business as usual" perspectives will deploy political and economic power to prevent reforms in a naïve hope that the harms coming will never be visited upon

---

natives/2373.

245. *See* Nicholas A. Robinson, Adapting to Earth's Anthropocene Epoch: The Evolution of Environmental Law, Lecture at 10th Annual Colloquium of the IUCN Academy of Environmental Law (July 3, 2012) (description *available at* http://digitalcommons.law.umaryland.edu/gelc/2012/july3_5E/4).

246. SANDRA COAXUM ALLEN, BANKRUPTCY LAW 15 (2008).

247. *See Nonbusiness Casualty and Theft Losses*, IRS, http://www.irs.gov/publications/p17/ch25.html (last visited Aug. 29, 2013).

248. *See* UNITED NATIONS DEV. PROGRAMME, TOWARDS HUMAN RESILIENCE: SUSTAINING MDG PROGRESS IN AN AGE OF ECONOMIC UNCERTAINTY 10-13 (2011), *available at* http://www.undp.org/content/dam/undp/library/Poverty%20Reduction/Towards_SustainingMDG_Web1005.pdf.

them.[249]

The second dimension of exploring law reform in the Anthropocene is more focused. While some new applications of older legal regimes, such as expanded concepts of casualty insurance, are identified, much more practical law reform study is needed. Other participants in the 2012 Sutton Colloquium will explore how laws may better refine and apply concepts of sustainability to enhance what this paper argues is an evolved reciprocity between nature and humans. This essay can only hint at some future law reform themes.

Reforms in either environmental law or sustainable development law have evolved more in reaction to the mistakes of an industrializing world, rather than because of an appreciation for, and systems for, environmental law, which may be complied with efficiency through environmental management techniques.[250] Worldwide, many regions have contributed to shaping environmental legislation and administrative regimes.[251] In the 19th century, Western European and North American nations pioneered the laws for conservation of nature and natural resources.[252] From the 1920s and in particular between 1970-90, the U.S.A., with Canada and Australia, provided innovative legal concepts and reforms.[253] In the decade of the 1990s, the European Union pioneered new refinements in environmental law.[254] Since 2000, leading developing nations, such as Brazil, have taken the lead in enacting innovations in legal norms.[255] China, for example, is exploring innovations such as legal designs for eco-cities.[256] Since environmental law must harmonize conduct across national borders, it is essential to compare, study, and learn about such environmental law developments.

---

249. *See* Daniel A. Farber, *Intoduction: Legal Scholarship, The Disaster Cycle, and The Fukushima Accident*, 23 DUKE ENVTL. L. & POL'Y F. 1, 1-2 (2012).

250. *See* Richard J. Lazarus, *Environmental Law After Katrina: Reforming Environmental Law by Reforming Environmental Lawmaking*, 81 TUL. L. REV. 1019, 1041-44 (2007).

251. *See Giving Force to Environmental Laws: Court Innovations Around the World*, PACE L. (Mar. 12, 2011), http://www.law.pace.edu/school-of-law/sites/pace.edu.school-of-law/files/IJIEA/IJIEABriefingPaper.pdf.

252. *See A Brief History of Conservation Planning*, LANDSCOPE AMERICA, http://www.landscope.org/focus/identify_priority_places/brief_history (last visited Apr. 16, 2013).

253. Nicholas A. Robinson, Keynote Address at the Olso University Rule of Law Conference: A Canon for the Anthropocene (May 9-11, 2012) (referenced in Ellen Margrethe Basse, *The Legal Design of Sustainability Criteria on Biofuels Used by the European Union*, 15 ENVTL. PRAC. 50, 51 (2012)).

254. *See, e.g.*, Harri Kalimo et al., *Greening the Economy through Design Incentives: Allocating Extended Producer Responsibility*, 21 EUR. ENERGY & ENVTL. L. REV. 274, 274 (2012) (discussing Europe's WEEE Directive that regulates the collection, recovery, and recycling of electrical equipment).

255. *See* Edésio Fernandes, *Implementing the Urban Reform Agenda in Brazil*, 19 ENV'T & URBANIZATION 177, 177 (2007).

256. *See* Axel Baeumler et al., *Eco-Cities and Low-Carbon Cities: The China Context and Global Perspectives*, *in* SUSTAINABLE LOW-CARBON CITY DEVELOPMENT IN CHINA, DIRECTIONS IN DEVELOPMENT 33, 34 (Axel Baeumler, Ede Ijjasz-Vasques & Shomik Mehndiratta eds., 2012), *available at* http://siteresources.worldbank.org/EXTNEWSCHINESE/Resources/3196537-1202098669693/4635541-1335945747603/low_carbon_city_full_en.pdf.

Innovations in environmental sustainability law will certainly evolve as humans learn to adapt to the conditions found in the Anthropocene epoch. For example if recognizing the three principles does motivate reforms, we may then inquire what sorts of changes reliance on the *Principle of Resilience* could induce. Measurements to track resilience can be developed. One may inquire whether any or all of the following would be treated as higher societal priorities, if there was an acknowledged duty to promote Resilience: recycling energy and materials to avert waste; providing everyone with access to systems of insurance; establishing buffer zones along watercourses; restoration of wetlands on coastal areas; proving buffer zones and land use rules adjacent to protected areas; reforestation of watersheds; providing distributed energy systems off the grid; extensive stock-piling of food supplies under the U.N.'s World Food Program; or enhancing social support and resettlement system for persons dislocated by environmental disasters or sea level rise.

One way to further harmonization of environmental law reform may be through requirements that all human enterprises use environmental management systems ("EMS"). As employed by a growing number of companies and some governments, EMS integrates analysis and compliance with all environmental stewardship tasks and legal obligations.[257] EMS is useful alike for companies, non-profit organizations, universities, military departments, agencies of government, and others. While EMS norms and procedures have been promulgated in many developed nations, such as the United Kingdom, EMS is by no means universally embraced.[258] EMS increasingly is being reshaped as "Sustainability Management Systems," to encourage a holistic approach adapted to the special characteristics of the entity employing the system.[259] EMS must evolve into adaptive management systems for the Anthropocene. EMS can promote resilience and effectuate one of the proposals to emerge from Rio+20; one outcome of the reform of the present UN Commission on Sustainable Development is for the UN General Assembly to adopt Sustainability Development Goals (like the UN's Millennium Development Goals) and then measure performance toward each goal annually.[260] EMS could be a means to implement specified and agreed "sustainability" goals.

Reforms are needed at local, regional, and state levels, and in intergovernmental international levels. Since Earth's natural systems are rarely congruent with the world's political borders, it is the human laws that will need to better indentify and conform to the laws of nature.

---

257. *Environmental Management Systems*, U.S. ENVTL. PROT. AGENCY, http://www.epa.gov/ems/ (last visited Apr. 10, 2013).

258. *See* David Morrow & Dennis Rondinelli, *Adopting Corporate Environmental Management Systems: Motivations and Results of ISO 14001 and EMAS Certification*, 20 EUR. MGMT. J. 159, 159 (2002) (demonstrating that EMS is still developing).

259. *See* William L. Thomas, *Rio's Unfinished Business: American Enterprise and the Journey Toward Environmentally Sustainable Globalization*, 32 ENVTL. L. REP. 10873, 10888 (2002).

260. *Future We Want*, *supra* note 80, ¶ 245.

The three *Principles of Cooperation*, *Nature Appreciation*, and *Resilience* are not yet adequately reflected in environmental management systems and other sustainability practices. Some examples may be suggestive of why this is so. Beyond expanding the use of EMS, there are many other possible avenues for sustainability reform; the Sutton Colloquium examined many. Five appropriate areas for reform in order to proactively cope with the Anthropocene, may be highlighted briefly.

A. Reform of Sustainable Development Laws

Laws governing sustainable development do not yet eliminate all waste or reuse and redeploy all materials and energy associated with manufacturing, construction, extraction of natural resources, or other activities. Growing scarcities of resources can stimulate innovations to treat "waste" as a source of valuable resources.

B. Wider Use of Spatial Planning and Evaluating Life Cycles of Products

Wider use in spatial planning should be required to develop the knowledge and techniques of industrial ecology, which provides holistic and integrated frameworks for sustainable development. Similarly, criteria and methods of evaluating the complete life cycle of a product, a building, or a service are essential tools for the environmental manager.

C. Mandated Technology Assessments and Evaluations

Technology assessment should become a standard practice. Specialized techniques for evaluating proposals of new technologies and their applications are significant components of design for sustainability. Evaluation of technological innovations and their uses can anticipate and avoid unintended adverse consequences. This assessment system should be essential for the "green revolution," as well as for geo-engineering proposals.[261]

D. Implementation of Innovations

Innovations in green technology need to be more widely substituted for fossil fuel dependent systems. Development of innovations in generating electricity from wind, solar, wave, and other renewable sources, as well as enhanced ways to save energy though new designs in appliances buildings and vehicles, is spawning entirely new opportunities for environmental management.[262] The International

261. The early work of the now abolished Congressional Office of Technology Assessment (OTA) in the United States needs to be re-evaluated and may be re-instituted. Management techniques for technology assessments give realistic effect to the "Precautionary Principle" and to get beyond unsubstantiated fears about new technologies and at the same time avert unintended consequences.

262. There remain many questions about how technology transfers will disseminate these innovations widely across all regions and nations. The endorsement of this growing dimension on environmental and energy design by the UN "Rio+20" Conference in 2012 brings this work under the rubric of AGENDA 21, as a step toward sustainability, and capacity to supply energy without the need

Renewable Energy Agency (IRENA) has been established to advance such alternative energy innovations.[263]

E. Implementation of Environmental Impact Assessment Laws

Robust and pervasive use of Environmental Impact Assessment ("EIA") laws is essential. EIA is not yet widely regarded as a foundation for sustainability. Procedures for undertaking, communicating, and constantly learning from and improving EIA are fundamental to sustainability. EIA should develop as a process used widely, and not only by governmental authorities. Private sector uses of EIA can integrate EMS into institutional practices, and promote greater rigor and transparency within other EIA systems, such as those employed by governmental agencies. Comparative EIA's learn from innovations in improved EIA systems and adapts the reforms to others. EIA needs to subsume the narrower body of lore and practice associated with "cost/benefit" analysis. Routine updating of prior EIA determinations, to address changing environmental conditions, is now done in a few countries,[264] but will need to become a standard practice. Principle 17 of the Declaration of Rio de Janeiro on Environment and Development requires EIA for national decision-making.[265] Nonetheless, many nations do not yet observe this standard. To facilitate adapting to changing conditions in the Anthropocene, EIA will play a central role. EIA can be used with every piece-meal action to explore how it can adapt to changing physical and social conditions.

The pressure to make the changes to law can come through public participation, a core aspect of environmental law. The rationale for and means by which all stakeholders are invited to participate in decisions is because environmental laws affect the public and associated interests. This includes access to environmental information and how such information is disclosed and accessed. Nations have enacted laws for disclosure of environmental information, rules for public participation, and access to justice.[266] More than four hundred environmental courts have been established in some forty nations.[267] Like *Agenda*

---

for carbon fuels.

263. *See* Conference on the Establishment of the International Renewable Energy Agency, Bonn, Ger., Jan. 26, 2009, *Statute of International Renewable Energy Agency*, art. 1, IRENA/FC/Statute, *available at* http://www.irena.org/documents/uploadDocuments/Statute/IRENA_FC_Statute_signed_in_Bonn_26_01_2009_incl_declaration_on_further_authentic_versions.pdf.

264. *See* HUSSEIN ABAZA, RON BISSET & BARRY SADLER, ENVIRONMENTAL IMPACT ASSESSMENT AND STRATEGIC ENVIRONMENTAL ASSESSMENT: TOWARDS AN INTEGRATED APPROACH 6 (2004), *available at* http://www.unep.ch/etu/publications/textONUbr.pdf.

265. *See Rio Declaration*, *supra* note 47, princ. 17.

266. Lalanath de Silva, *Introduction* to GEORGE PRING & CATHERINE PRING, GREENING JUSTICE: CREATING AND IMPROVING ENVIRONMENTAL COURTS AND TRIBUNALS ix, ix (2009).

267. Nicholas A. Robinson, *Ensuring Access to Justice Through Environmental Courts*, 29 PACE ENVTL. L. REV. 363, 368 (2012) (citing a seminal study by Professor George (Rock) Pring & Catherine (Kitty) Pring, GEORGE PRING & CATHERINE PRING, GREENING JUSTICE: CREATING AND IMPROVING ENVIRONMENTAL COURTS AND TRIBUNALS 1 (2009)) [hereinafter Robinson, *Access to Justice*].

21, Principle 10 of the Declaration of Rio de Janeiro on Environment and Development posits that active public participation is essential to sustainable development.[268] The techniques for giving information and timely notice to the public about possible actions before they are taken, for educating the general public, and for consulting all stakeholders, are essential to building resilience and long-term sustainability of socio-ecological systems.

Public participation, in turn, relies upon strengthening the rule of law and access to justice. Honest government, open to the petitions of its citizens, is essential to justice. Environmental management systems require integrity in their deployment. Many regions lack the rule of law.[269] Asia has become the world's leader in establishing environmental courts and tribunals toward this end.[270] India has adopted its Green Tribunals Act and established its first regional environmental courts to vindicate the rule of law and apply environmental sustainability rules.[271] China has more than fifty environmental courts, capable of hearing citizen complaints against polluters, in fourteen Provinces.[272] The Philippines has environmental courts and has established the Writ of *Kalikasan* (Nature) to facilitate vindicating environmental rights throughout the Philippine courts.[273] Cities and states that allow for public participation in environmental decision-making build resilience and sustain stable social order at the same time; the failure to do so can produce social unrest, as in conditions leading to the Arab Spring of 2011[274] or the electoral demonstrations of 2012 in Russia.[275]

VI. CONCLUDING THOUGHTS

Recognizing the advent of the Anthropocene conceptually allows society to reset the clock and begin anew. With two billion additional humans being born in the next few decades, humans need an approach to help societies to muddle through. The scale of change is unlikely to facilitate orderly process. More than a still confused concept of "sustainable development" will be needed. World Order

---

268. *Rio Declaration*, *supra* note 47, princ. 10.

269. *See Future We Want*, *supra* note 80, ¶ 185.

270. *See* GEORGE PRING & CATHERINE PRING, GREENING JUSTICE: CREATING AND IMPROVING ENVIRONMENTAL COURTS AND TRIBUNALS 106-08 (2009).

271. Robinson, *Access to Justice*, *supra* note 267, at 382.

272. *Id.*

273. *Id. See also* Rules of Procedure for Environmental Cases, A.M. No. 09-6-8-SC (S.C., Apr. 13, 2010) (Phil.), *available at* http://www.lawphil.net/courts/supreme/am/am_09-6-8-sc_2010.html. As courts implement Principles 10 (public participation) and 17 (environmental impact assessment) of the 1992 *Rio Declaration on Environment and Development*, environmental sustainability will advance as it is in Asian cities.

274. *The Arab Spring: A Year of Revolution*, NPR (Dec. 17, 2011, 6:02 PM), http://www.npr.org/2011/12/17/143897126/the-arab-spring-a-year-of-revolution.

275. Tom Parfitt, *Moscow Protest: Opposition Call for Civil Rights Campaign Against Vladimir Putin After His Election Victory*, THE TELEGRAPH (Mar. 10, 2012, 3:51 PM), http://www.telegraph.co.uk/news/worldnews/europe/russia/9135792/Moscow-protest-opposition-call-for-civil-rights-campaign-against-Vladimir-Putin-after-his-election-victory.html.

is not structured yet to cope in ways that will ensure rights that today are enshrined by either humanitarian law or human rights law or environmental law. The newest and weakest of these three is the law for humans and nature. By accepting the three foundational general principles of law described above, all societies can instinctively pursue similar approaches to meeting the unknown changes of the Anthropocene.

As evolved traits of human nature, the *Principles of Cooperation*, *Biophilia*, and *Resilience* are apt to find favor among people found across all countries. They "ring true" experientially. Learning from and exchanging experience in applying the principles can help to transform "business as usual" into more sustainable environmental management systems, and then beyond to practices that collectively constitute stewardship of nature.

This coming body of law and practice can help clarify what nations mean by "sustainability" and move "sustainable development" beyond being merely a polished version of "business as usual." Earth will adjust and adapt to the new conditions in the Anthropocene. The issue is what dimensions of human civilization will muster the resilience to sustain our civilization.

Humans need to take stock of what traits and human attributes can best be aligned to cope with the new and emerging conditions of life on Earth. Much remains to be studied and done. The 45th Sutton Colloquium is an essential first step on this existential path forward. Our international and national laws alike must come to understand and embrace the principles that emerge from understanding our traits of evolved human nature. The very name, Anthropocene, requires no less.